eport No. 8 March, 1961

PRIMARY ASPECTS OF POTATO MARKETING IN MANITOBA

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PREFACE

Manitoba potato growers are beset by many problems in the marketing of their product as a result of conditions within and without the industry. The emphasis in the past has been primarily on the solution of the problems involved in production with lesser emphasis being placed on the problems associated with marketing.

This investigation is of the nature of a survey of the situation currently existing at the grower level. A more comprehensive analysis should be undertaken after adjustment has taken place in response to the rapid technological change that is presently occurring.

The writer wishes to acknowledge the assistance of many individuals and firms in the compilation of the data. Recognition is due to Dr. Sol Sinclair, head of the Department of Agricultural Economics, under whom the study was initiated, to Dr. A. W. Wood for his direction in the research and his suggestions for revisions in the manuscript, and also to my colleagues for the valuable suggestions and advice given. The writer is also indebted to the Vegetable Growers Association of Manitoba, Souris Producers Ltd., Plum Coulee Growers Ltd., B. Proud, and D. Brown for their assistance in the collection of the data, to E. A. Poyser for the classification of soil types, to the Dominion Bureau of Statistics, the Canada Department of Agriculture, and the Manitoba Department of Agriculture and Conservation who supplied statistical information, and also to the Canadian National Railways for the provision of freight schedules. Special appreciation is expressed for the information provided by P. Peters, L. Jorgenson and T. Sandercock of the Extension Service on the results of their projects among growers.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF CHARTS

PRIMARY ASPECTS OF POTATO MARKETING IN MANITOBA

CHAPTER I

INTRODUCTION

Historical Review

A comprehensive study of the marketing of fresh fruits and vegetables in Manitoba was conducted by the Economics Division of the Canada Department of Agriculture in cooperation with Provincial Department in 1945-46. The results of the study were reported in The Marketing of Fresh Fruits and Vegetables in Greater Winnipeg, published in 1946. This detailed report contained several recommendations and suggestions for improving marketing facilities and practices. There were seven general recommendations, namely;

1. That a centrally located public market be established in Winnipeg with adequate accommodation for producers and other users.
2. That adequate packing and cold and dry storage facilities be provided in a building adjacent to the proposed market site.
3. That under the authority of the Manitoba Vegetable Sales Act (Chap. 64, Statutes of Manitoba, 1941-42), specific regulations be established for all Manitoba small fruits, vegetables and potatoes. Further, that the Minister of Agriculture appoint an inspector or inspectors to enforce the regulations, as provided in Section 4 of the Act.
4. That a system of crop reporting be established which would provide dependable information at regular intervals concerning local produce crops and prevailing market prices.
5. That an agricultural representative be assigned to the Winnipeg Market Garden Area, and that his time and energies be devoted exclusively to assisting local produce growers in planning small fruit and vegetable production.
6. That steps be taken to attract those wholesalers and jobbers now scattered throughout the northern part of the city to a central and adequate location near the present popular "Fruit Row" site.

7. That overtures be made to the city of Winnipeg requesting elimination of the marginal tree-lined boulevard on the south side of Ross Avenue between Salter and Ellen Streets.

In addition to these recommendations a study of the possibilities for processing was suggested and an investigation of the possibilities of increasing small fruit production was proposed. Continued observation of the market following the implementation of the recommendations was also considered desirable in view of the agitation by certain groups of growers for a controlled production and marketing scheme.

It would be appropriate at the outset of this report to give a historical sketch of the improvements that have taken place to date. As a general observation, it would appear that there has been a lack of concerted attention to carrying out the recommendations. Some improvements have taken place but there is no evidence of a comprehensive plan for following the procedure suggested. The recommendations have been justified over time and are evidence of a well conceived program.

The theme of the recommendations was the establishment of a "focal point of control". This was proposed since it was the primary requirement for the market improvements suggested, such as grade standardization, improved market information, adequate cold storage facilities, and convenient offices for an Agricultural Representative. In view of recent developments the achievement of this focal point has become increasingly remote. Relocation of the sites of the wholesale section of the trade is gradually taking place. Thus, one large wholesaler has located in an ultra-modern plant in the west end of the city with a location area greater than the entire "Fruit Row". Another wholesaler is currently constructing a warehouse on a proximal site. The North End Retail Public Market is currently in the process of relocation to Nairn Avenue adjacent to Highway 59. The reasons for these shifts are economic. Modern establishments

require a considerable area of land, and this land with adequate trackage is not available in downtown locations except at prohibitive cost. Improvements in transportation have likewise rendered a downtown location less desirable. It is a considered opinion that the wholesale outlets will become progressively relocated in response to these economic forces. However, while the idea of a focal point of control is an excellent one, adoption of the recommendations will have to be modified in view of the increasing decentralization.

There has been considerable improvement in packing and storage facilities since the recommendations were made. Little progress has been made from the standpoint of storage in a central location for the specific purpose of extending the marketing season for Manitoba vegetables. The Dominion Government subsidizes storage construction under two plans. Under one plan a subsidy for the construction of public warehouse, controlled-temperature storage is given which consists of a grant of one third of the cost of the unit or $50,000, whichever is the lesser. The other plan is a program of subsidy specific to cooperatives for potato warehouse construction. Under this scheme the participating cooperative agrees to provide one quarter of the initial cost of the warehouse and the Federal and Provincial Governments agree to put up the remaining three quarters on an equal basis. One half of the Provincial payment and one half of the Federal payment becomes a grant with the remainder being paid back by a unit charge on the produce handled through the warehouse. To date this latter arrangement has not been operative in Manitoba since the Provincial Government has not passed enabling legislation or participated in the scheme. As a matter of policy this is one area deserving consideration by the local legislators since other provinces have taken advantage of the scheme.

Grading regulations are enforced by Federal inspectors of the Marketing Service. There have been no Provincial inspectors appointed as yet as recommended

by the previous study. The grades tend to be administered at the retail level. Considerable dissatisfaction exists in the industry over the manner in which the grades are enforced, though there has been substantial improvement over time. However, much produce escapes the eyes of the inspectors, particularly where it circumvents the Winnipeg market. This uninspected merchandise may be below grade and so do little to promote an expansion of the market for local product. Further, with respect to potatoes in the current study, it is evident that while a wide range of quality exists within the so-called No. 1 grade, the price paid to the grower tends to be more in the nature of an average for all qualities and so gives insufficient incentive for substantial grade improvement at the grower level.

A crop reporting service, as suggested by the former study, has not been developed. The Vegetable Growers Association of Manitoba, however, fostered the formation of a fact-finding committee among the interested wholesalers of local produce. This committee has performed a very valuable function within the limitations in which it operates. An effort is made to determine the volume of local supplies and the delivery dates for specific vegetables and to supply this information to the wholesalers. The Extension Service of the Provincial Department of Agriculture cooperates with this committee. In addition, the Extension Service collects information from the growers by the questionnaire method but some difficulty is experienced in getting complete grower cooperation. Before such a voluntary system can be effective a prolonged educational program will be necessary and this will entail some difficulty due to the inherent nature of the population as will be pointed out later in this report. However, a crop reporting system as envisaged in the recommendations of the former study is not currently contemplated. This is unfortunate indeed since a Government agency should be better able to obtain unbiased information than any other group.

The suggestion that an Agricultural Representative be assigned to the Winnipeg Market Garden Area has been followed. In addition to a Provincial

Horticulturalist, the current staff of the Department of Agriculture includes a potato specialist with an assistant and a vegetable specialist. However, direction in production planning at the grower level as suggested, has not been considered a responsibility of the Department.

As previously noted, the recommendation with regard to centralization of wholesale outlets has not been carried out. There has been a complete lack of any concerted effort to accomplish centralization and, in view of current developments, it might well have been futile. As mentioned previously also, there is some possibility of wholesale outlets being relocated in proximity to one another in the western part of the city. Ross Avenue has been widened subsequent to the Report. However, the wider street is scarcely adequate for modern transports which continue to increase in size. The result is congestion in the "Fruit Row" location, in itself a factor in the current relocation of the wholesale outlets.

The suggestion for an increase in small fruit production was well founded. A slowly expanding industry along this line is developing with pockets of local concentration, one of which exists in the Portage la Prairie area. Other developments which have taken place are the location of canning factories at Winkler and Morden, though these plants do not process surpluses as such. A pickle factory is located at Winnipeg. In addition, a soup plant has begun operations at Portage la Prairie. However, a program for the processing of surpluses has not developed. A discussion of the possibilities for potato processing will appear later in this report.

The organized growers have endeavoured to improve their own industry. With the organization of the Vegetable Growers Association of Manitoba in 1953, the growers obtained a united voice. As a result predatory competition between growers has been reduced though not eliminated. Among the suggestions for market improvement that have been advanced by growers are those for a central grading station and for a marketing board. The former suggestion has not met with

favourable Government action as yet whereas the grower vote on a marketing scheme in 1958 failed to obtain the required majority. In addition, a unified grower marketing organization has been established and is continuing to expand its share of the market. Some improvements in grade standards have also been obtained as a result of grower action. A point not to be overlooked is the experience the growers have obtained by working together in the Association both on the Federal as well as Provincial level.

Objectives of the Study

With a large local crop of potatoes in evidence in the fall of 1958, and a very large crop in North Dakota, local growers feared price deterioration. Application was made by the Vegetable Growers Association for deficiency payments under the Agricultural Prices Support Act. The organization was advised at the Federal level to obtain the cooperation of the Provincial Government in the recording of grower deliveries of potatoes. Subsequently the cooperation of the Provincial Government was obtained and a recording office established at 20 Derby Street. In order to make the fullest use of the data collected by the recording office the Government asked the University to undertake concurrently a study of potato marketing in Manitoba.

Under the terms of reference of this study several aspects of potato marketing will be considered. Since production has implications in potato marketing the influence of this factor will be briefly considered. Other aspects to be considered include the demand and supply situation, production trends, transportation facilities, grades and packaging, price movements, marketing margins and storage facilities. The primary emphasis of the study is on marketing at the grower level.

CHAPTER II

TRENDS IN THE POTATO INDUSTRY

The Potato Industry in Canada and Manitoba

The area devoted to potatoes in Manitoba declined from 34,000 to 15,300 acres in the 1935-57 period, a decline of 55 per cent as shown in Table 1. During this period, for Canada as a whole, the acreage declined from 507,000 to 311,000, a decline of 39 per cent. As will be observed from Chart 1, the trend has followed approximately the same pattern in both cases, though the decline has been relatively greater in Manitoba than in the country as a whole.

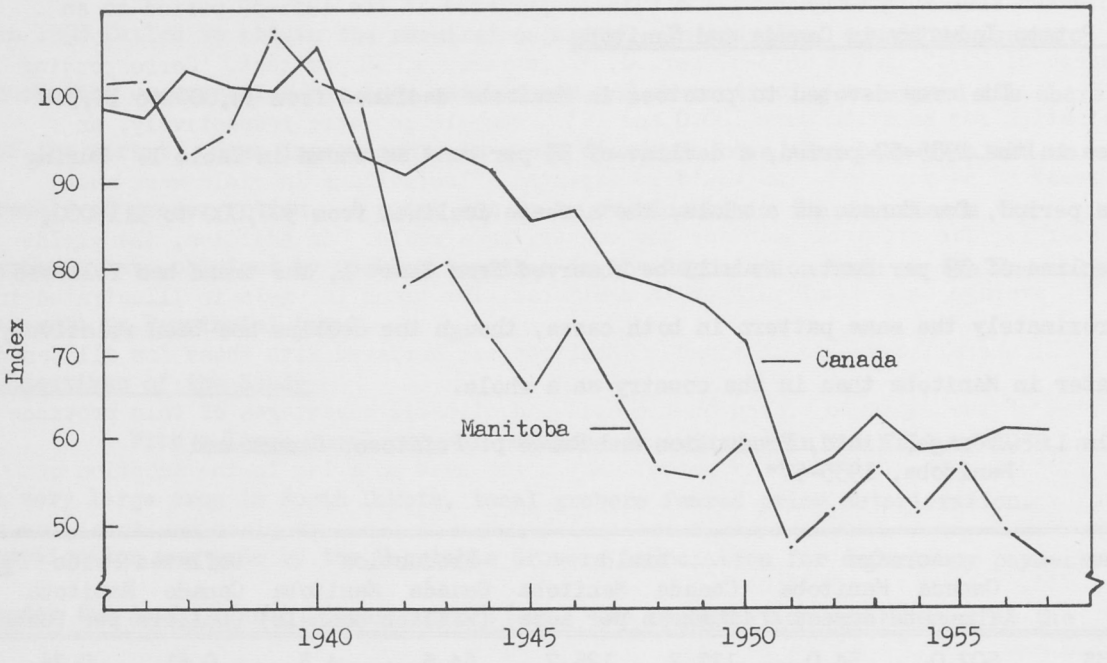
Table 1: Average, Yield, Production and Price of Potatoes, Canada and Manitoba, 1935-57*

Year	Acreage		Yield		Production		Deflated Price a/	
	Canada	Manitoba	Canada	Manitoba	Canada	Manitoba	Canada	Manitoba
	(Thousand acres)		(Bushels per acre)		(Million bushels)		(Dollars per bushel)	
1935	507.0	34.0	127.2	125.7	64.5	4.3	0.51	0.26
1936	502.0	34.0	131.5	50.0	66.0	1.7	0.70	0.87
1937	531.0	31.0	133.5	133.3	70.9	4.1	0.35	0.32
1938	522.0	32.0	115.0	100.0	59.9	3.2	0.54	0.34
1939	518.0	36.0	116.7	93.3	60.7	3.4	0.69	0.58
1940	545.0	34.0	130.0	86.7	70.5	3.0	0.46	0.52
1941	479.5	33.2	128.7	150.0	61.7	5.0	0.64	0.40
1942	467.4	25.9	141.6	136.7	66.2	3.5	0.74	0.46
1943	484.3	26.9	137.5	141.7	66.6	3.8	0.84	0.56
1944	471.0	24.2	156.4	83.3	73.6	2.0	0.70	0.60
1945	439.1	21.9	121.0	100.0	53.1	2.2	1.01	0.73
1946	445.7	24.6	156.1	90.0	69.6	2.2	0.73	0.68
1947	408.2	21.6	155.2	123.3	63.4	2.7	0.80	0.61
1948	400.8	18.7	184.6	136.7	74.0	2.6	0.51	0.51
1949	389.4	18.4	181.8	113.3	70.8	2.1	0.46	0.60
1950	369.6	19.9	197.6	142.0	73.0	2.8	0.35	0.43
1951	284.9	15.8	169.7	142.0	48.4	2.2	0.86	0.62
1952	296.8	17.3	202.4	159.0	60.1	2.8	0.74	0.71
1953	323.1	18.8	209.1	170.0	67.5	3.2	0.35	0.29
1954	299.7	17.1	172.8	135.0	51.8	2.3	0.67	0.56
1955	303.1	19.0	214.5	135.0	63.6	2.6	0.48	0.59
1956	312.5	16.5	225.7	185.0	70.5	3.1	0.51	0.32
1957	311.0	15.3	230.7	115.0	71.8	3.1	0.38	0.63

* Dominion Bureau of Statistics, Agricultural Division, Quarterly Bulletin of Agricultural Statistics, appropriate periods.

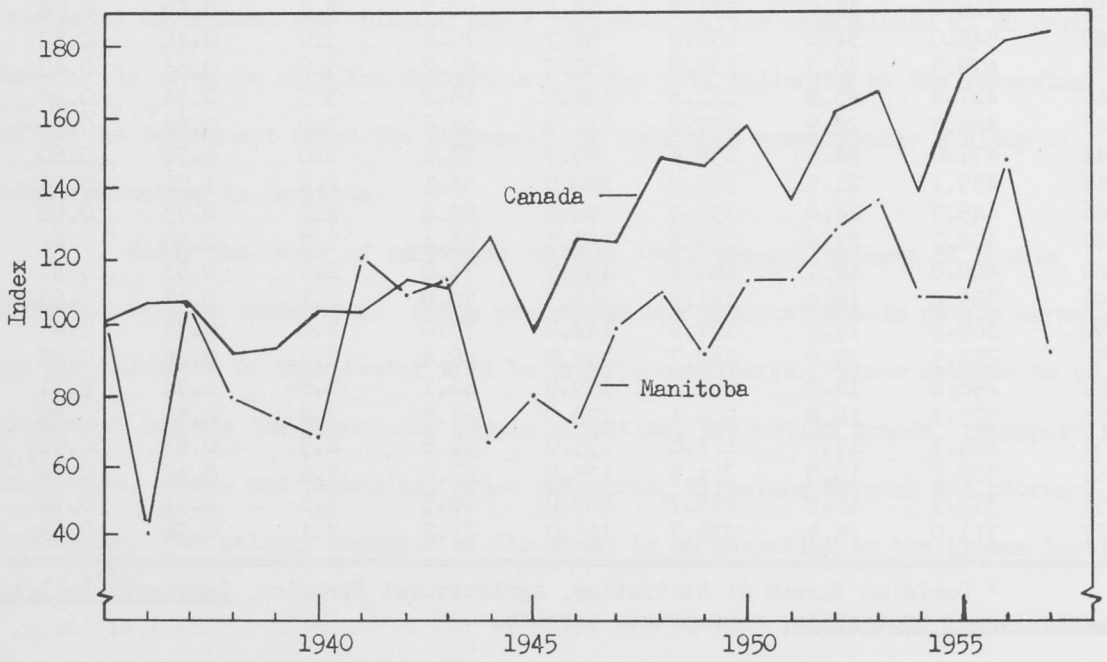
a/ In 1935-39 dollars.

CHART 1: INDEX OF POTATO ACREAGE, CANADA AND MANITOBA, 1935-57*



* Source: Calculated from data in Table 1 with 1935-39 = 100 as base

CHART 2: INDICES OF POTATO YIELDS, CANADA AND MANITOBA, 1935-57*



* Source: Calculated from data in Table 1 with 1935-39 = 100 as base

The yield of potatoes has been increasing over time. For Canada, the yield increased from an average of 124.8 bushels per acre in the 1935-39 period to an average of 209.9 in the 1953-57 period, an increase of 68 per cent. Corresponding statistics for Manitoba were 100.0 and 163.5 bushels per acre respectively, an increase of 64 per cent. As would be expected, fluctuations in yield were much greater for the province than for the country as a whole. In addition, the yields on the average were usually lower in Manitoba. The trend in yield is illustrated in Chart 2, where the yields obtained in Manitoba are compared with those for all Canada. In view of the emphasis placed on the soil and climatic advantages of this province for producing potatoes it is apparent that there must be a lag in the adoption of improvements in technology. This lower average yield tends to place Manitoba growers in a disadvantageous position.

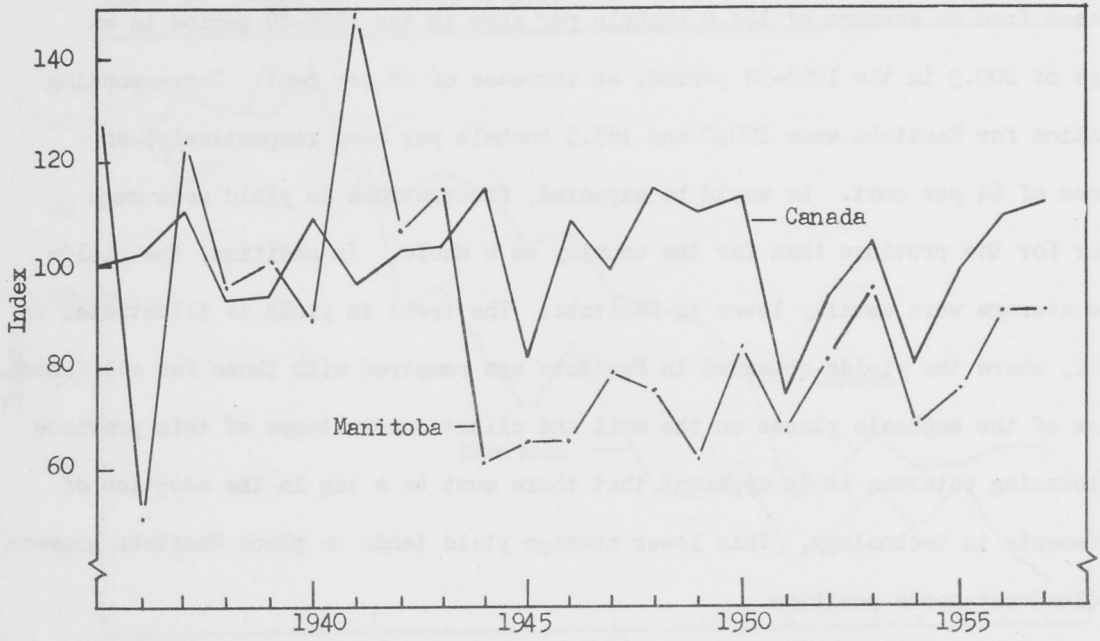
Production

While the production of potatoes in Canada was greater in 1957 than in 1935, 71.8 million as compared to 64.4 million bushels, over the period as a whole production tended to remain stable. On the other hand, year to year variations in production were considerable greater in Manitoba. A peak in Manitoba production was reached in 1941 when 5.0 million bushels were produced and a low point was recorded in 1936 with the production of only 1.7 million bushels. Over the 1935-57 period the trend was for production to show a slight decline, as can be seen in Chart 3.

Prices

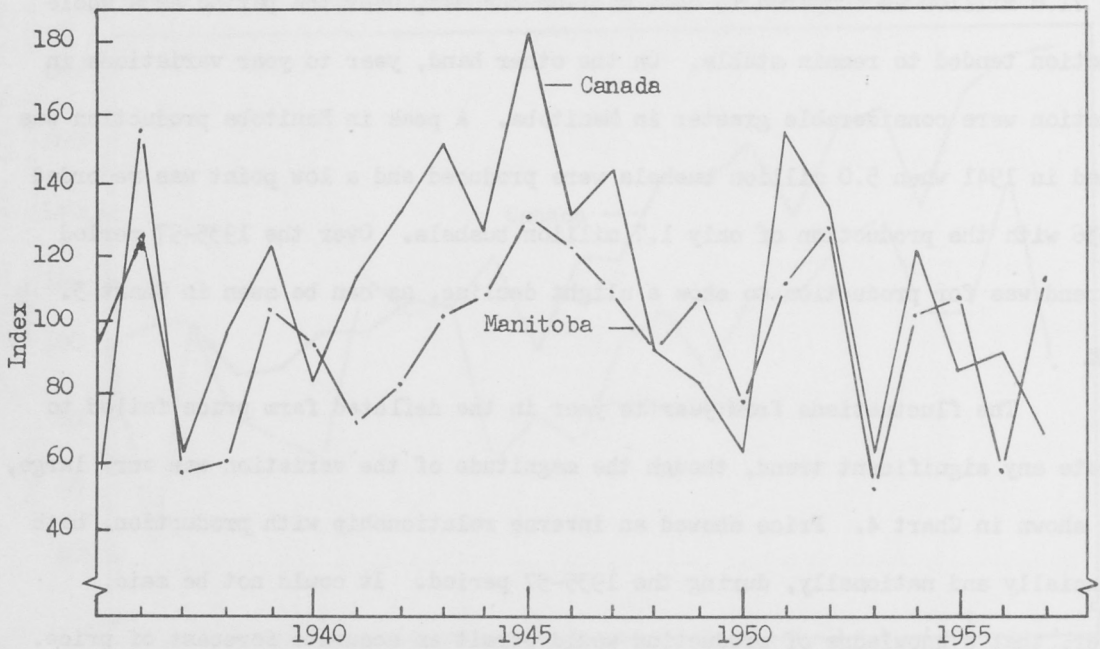
The fluctuations from year to year in the deflated farm price failed to indicate any significant trend, though the magnitude of the variation was very large, as is shown in Chart 4. Price showed an inverse relationship with production, both provincially and nationally, during the 1935-57 period. It could not be said, however, that a knowledge of production would permit an accurate forecast of price. As is indicated by Chart 5, the price-production movements were not uniform. Imports and exports, dislocation due to wars, and price control, all had an influence on the

CHART 3: INDEX OF PRODUCTION OF POTATOES, CANADA AND MANITOBA, 1935-57*



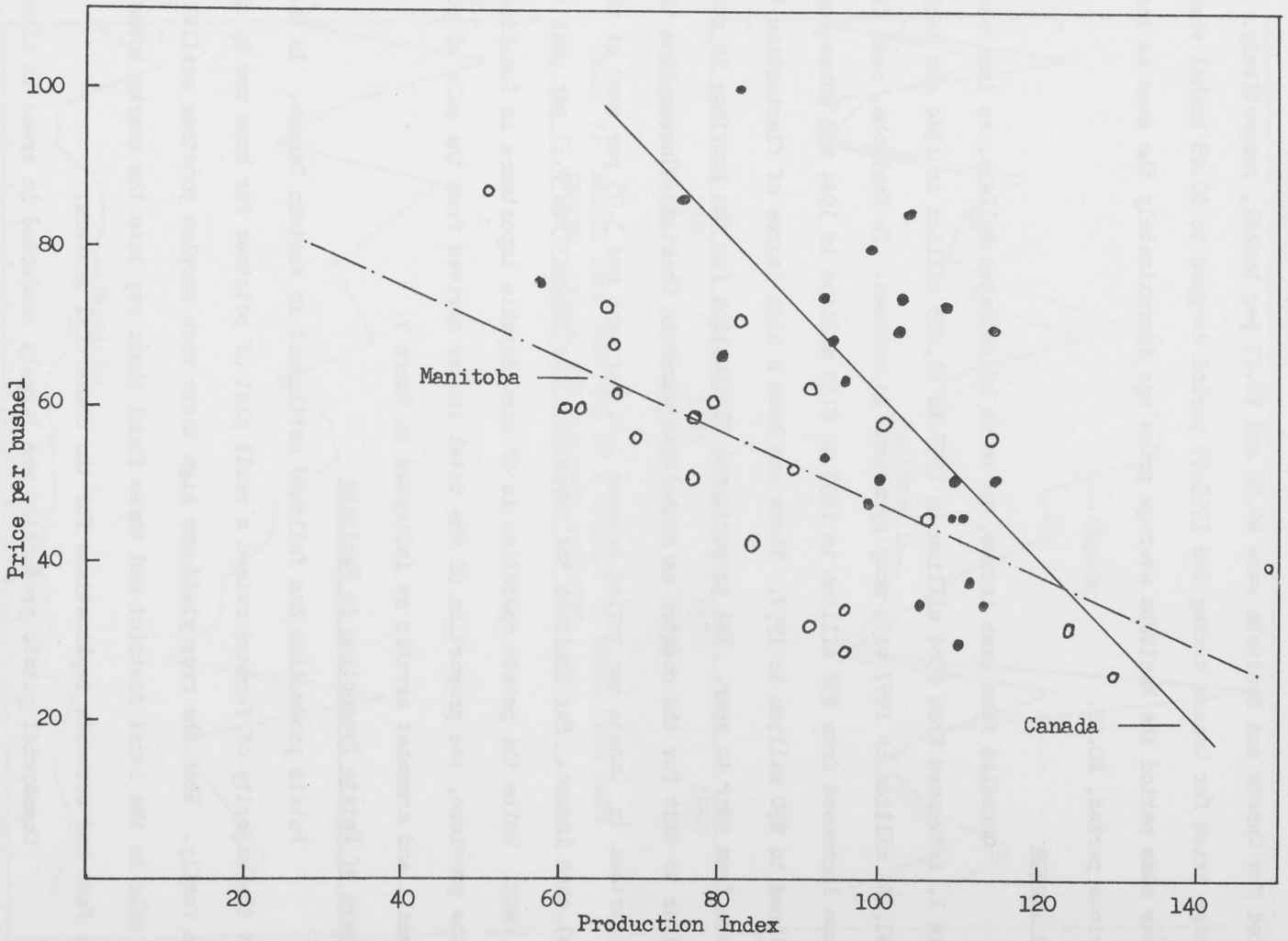
* Source: Calculated from data in Table 1 with 1935-39 = 100 as base

CHART 4: INDEX OF DEFLATED POTATO PRICES, CANADA AND MANITOBA, 1935-57*



* Source: Calculated from data in Table 1 with 1935-39 = 100 as base

CHART 5: RELATION BETWEEN ANNUAL PRODUCTION AND DEFLATED PRICE OF POTATOES, CANADA AND MANITOBA 1935-57*



* Source: Calculated from data in Table 1 with production index based on 1935-39 = 100 and regression lines fitted by method of least squares.

price the grower received. The average deflated prices received during the 1935-39 period for Canada and Manitoba were $0.56 and $0.47 per bushel, respectively. The average price for Canada during the 1953-57 period dropped to $0.48 bushel whereas in the same period the Manitoba average price was approximately the same as the previous period, $0.48.

Cash Income

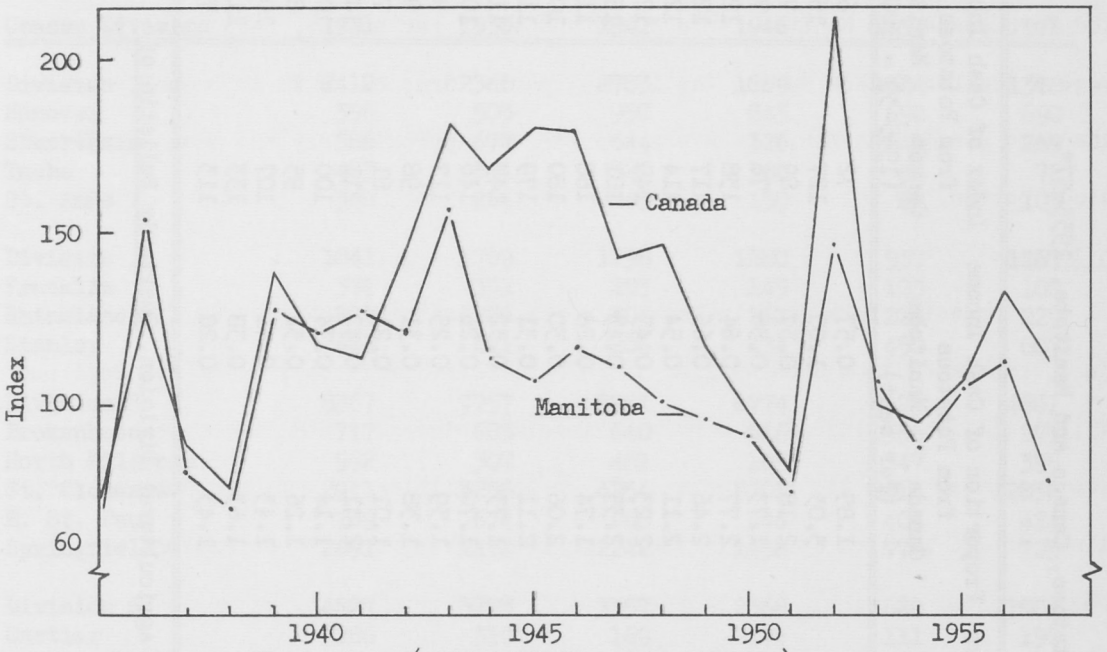
Canadian farm cash income, in terms of deflated dollars, as indicated in Table 2, increased from $564 million in 1935 to $1,403 million in 1944 and declined to $1,141 million in 1957 with many gyrations in between. In Manitoba, cash farm income increased from $38 million in 1935 to $133 million in 1944 and subsequently declined to $90 million in 1957. There has been a high degree of fluctuation in income from year to year. The proportional fluctuation for the province is quite similar to that for the country as a whole as shown in Chart 6. Income from the sale of potatoes in Canada has varied between 1.01 per cent and 3.03 per cent of the total cash income. For Manitoba the proportion has ranged from 0.21 per cent to 1.00 per cent. While the potato operation is of considerable importance in localized areas of the province, the proportion of the total income derived from the sale of potatoes is small and somewhat erratic as indicated in Chart 7.

Pattern of Potato Production in Manitoba

Potato production has followed settlement in Western Canada. In the past the majority of farmers raised a small plot of potatoes for home use by the farm family. When the crop yield was high there were surplus potatoes available for sale in the local district and these found their way into the nearby towns. This fact had economic implications for the commercial growers.

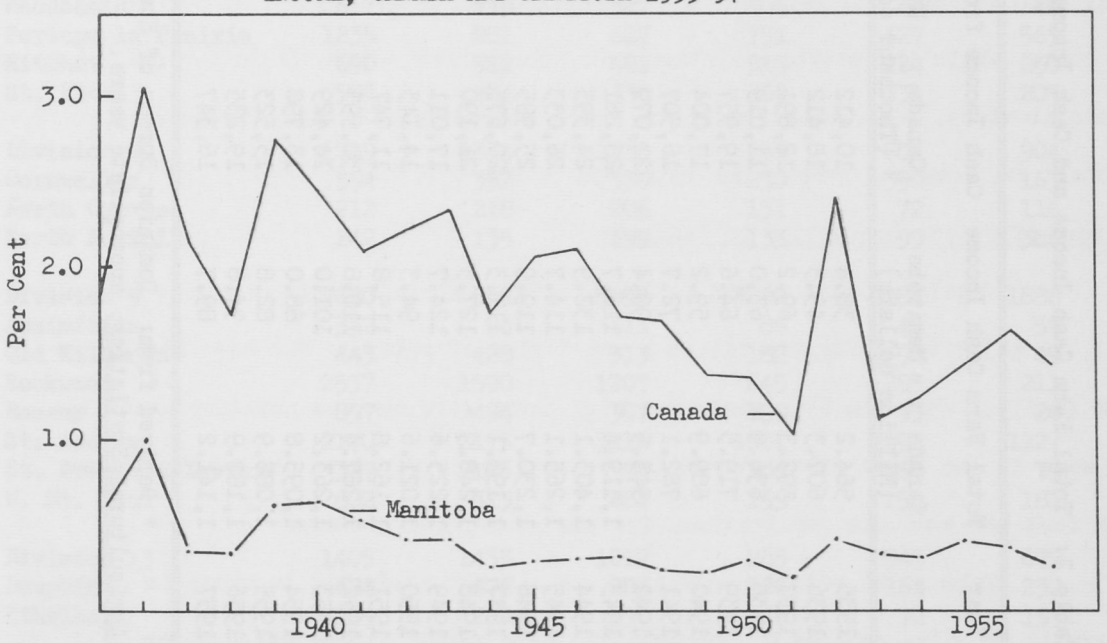
Commercial potato production was largely conducted in areas in close proximity to major centres of population. As a result, there was a major

CHART 6: INDICES OF FARM CASH INCOME FROM POTATOES, CANADA AND MANITOBA, 1935-57*



* Source: Table 2 (with 1935-39 = 100 as base)

CHART 7: INCOME FROM POTATOES AS A PERCENT OF TOTAL CASH FARM INCOME, CANADA AND MANITOBA 1935-57*



* Source: Table 2

Table 2: Total Farm Cash Income and Cash Income from Potatoes, Canada and Manitoba, 1935-57*

Year	Total Farm Cash Income		Cash Income from Potatoes		Proportion of Cash Income from Potatoes		Index of Cash Income from Potatoes	
	Canada	Manitoba	Canada	Manitoba	Canada	Manitoba	Canada	Manitoba
	(Million dollars)		(Thousand dollars)		(Per cent)		(1935-39 = 100)	
1935	564.2	38.4	10,412	219	1.85	0.57	72	68
1936	607.3	49.3	18,412	494	3.03	1.00	127	154
1937	592.3	69.2	12,891	254	2.18	0.37	89	79
1938	636.9	63.0	11,019	226	1.73	0.36	76	70
1939	719.5	64.6	19,957	412	2.77	0.64	138	128
1940	689.9	59.2	17,004	389	2.46	0.66	117	121
1941	782.1	72.7	16,507	412	2.11	0.54	114	128
1942	945.5	90.4	21,079	389	2.23	0.43	145	121
1943	1,119.4	116.7	26,281	501	2.35	0.43	181	156
1944	1,403.1	132.9	24,393	367	1.74	0.28	168	114
1945	1,265.1	114.7	26,033	343	2.06	0.30	180	107
1946	1,230.7	119.9	25,995	373	2.11	0.31	179	116
1947	1,193.1	111.3	20,675	353	1.73	0.32	143	110
1948	1,248.9	127.5	21,190	326	1.70	0.26	146	102
1949	1,225.6	124.7	17,011	308	1.39	0.25	117	96
1950	1,021.6	94.3	14,143	291	1.38	0.31	98	91
1951	1,162.8	115.8	11,747	241	1.01	0.21	81	75
1952	1,267.4	110.8	30,593	468	2.41	0.42	211	146
1953	1,263.2	101.0	14,429	344	1.14	0.34	100	107
1954	1,095.8	88.0	13,798	281	1.26	0.32	95	88
1955	1,088.9	82.8	15,523	338	1.43	0.41	107	105
1956	1,182.9	94.8	19,235	364	1.63	0.38	133	113
1957	1,141.2	89.7	16,347	255	1.43	0.28	113	79

* Derived from: Dominion Bureau of Statistics, Agricultural Division, Quarterly Bulletin of Agricultural Statistics, appropriate years.

Table 3: Acres in Potatoes in Selected Census Divisions and Subdivisions of Manitoba, Census Years 1931 to 1956*

Census Division	1931	1936	1941	1946	1951	1956
Division 1	2412	2368	2783	1869	1384	1388
Hanover	396	503	950	843	698	690
Stuartburn	586	677	644	326	248	269
Tache	403	341	326	182	64	72
St. Anne	348	266	249	150	66	103
Division	1841	1709	1298	1280	937	1267
Franklin	374	352	285	149	103	108
Rhineland	289	286	304	262	229	229
Stanley	441	421	206	454	450	607
Division 5	8367	7757	8961	6774	4524	4861
Brokenhead	717	683	640	666	356	273
North Kildonan	592	307	481	185	347	395
St. Clements	2911	3258	4254	3701	2414	2838
E. St. Paul	769	674	668	346	404	424
Springfield	2691	2172	2242	1438	779	725
Division 6	4827	3273	3357	2568	1628	1904
Cartier	286	310	169	175	111	190
Charleswood	273	116	225	140	45	32
Dufferin	371	279	267	334	145	424
Ft. Garry	487	515	397	175	192	116
Grey	254	141	66	113	97	68
Macdonald	617	278	327	101	42	46
Portage la Prairie	1235	881	887	751	427	565
Ritchot	690	511	681	515	224	250
St. Vital	596	224	330	260	331	205
Division 7	1719	1334	1310	938	805	904
Cornwallis	594	352	330	230	350	163
North Cypress	212	218	206	131	72	116
North Norfolk	242	135	199	133	99	386
Division 9	7620	5491	5852	3292	2187	1888
Assiniboia	332	94	111	86	49	59
Old Kildonan	443	428	313	182	94	49
Rockwood	2537	1590	1207	645	283	211
Rosser	857	494	307	190	93	26
St. Andrews	2170	2175	3116	1801	1292	1227
St. Francois Xavier	327	146	95	108	160	79
W. St. Paul	602	313	484	159	150	181
Division 13	1405	1455	1012	865	545	679
Dauphin	474	476	205	226	164	232
Ethelbert	279	288	290	156	72	153
Manitoba	37938	33564	33206	24588	15846	16503

* Dominion Bureau of Statistics, Census Volumes, 1931 to 1956.

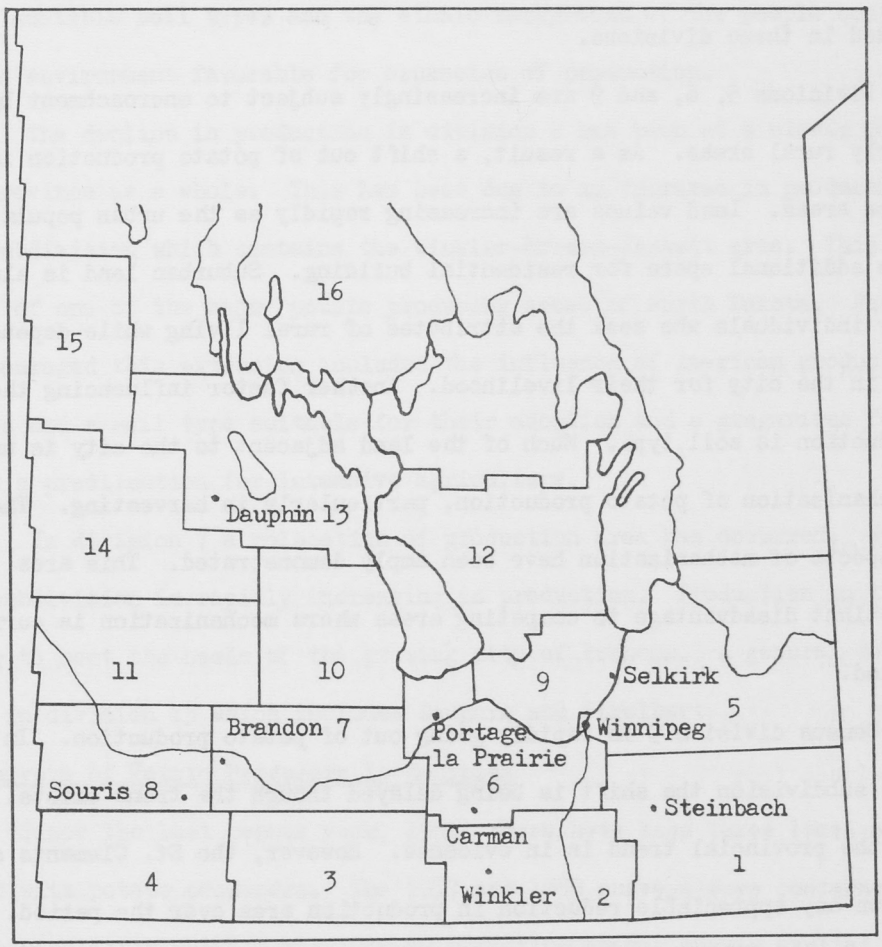
concentration of production in the Winnipeg area, with lesser concentrations located around Brandon and Portage la Prairie. Commercial production during the development period reflected the restrictive influence of existing transportation facilities. This pattern continued with little change until World War II. During the decade following 1940, production increased in the southern part of the province. To quote a paragraph from the former study:

"Manitoba potatoes originated for the most part in the district north of Winnipeg and east of the Red River, but are also important in the area south of Winnipeg near the United States Boundary. Sales from this latter area are included under district 5. (Note: District 5 included all areas not adjacent to Winnipeg.) Growers in the area are large commercial producers with acreages ranging from 10 to 15 acres. Sales reported by growers in this district average $5,500 per grower." 1/

In order to follow the trend in the province as a whole reference may be made to Table 3 where acreage figures are given for Census divisions and subdivisions important in their contribution to potato production. Over the twenty-five year period the acreage devoted to potatoes in the province declined from 37,938 acres to 16,503 acres. During the same period the population of the province increased from 700,139 to 850,040. Also, during the period the farm proportion of the total population declined from 36.6 to 24.3 percent. The decline in acreage suggests, among other possibilities, that either the yield is increasing, the consumption per capita is decreasing, or imports are increasing. Reference to these features will be made later in this report.

1/ Elliot, R. S., et. al., The Marketing of Fresh Fruits and Vegetables in Greater Winnipeg, King's Printer, Winnipeg, 1946, p. 30.

CHART 8: CENSUS MAP OF MANITOBA*



* Source: Census of Canada, Vol. VIII, Agriculture, Part II.

Divisions deviating from the provincial pattern included 1, 2, 5, 6, 7, 9 and 13. Within these specific divisions also, shifts in production areas were taking place. A map of the census divisions is included, Chart 8, to illustrate th areas where shifts have occurred. The City of Winnipeg is part of divisions 5, 6, and 9. The areas of greatest concentration of potato production in the past have been included in these divisions.

Divisions 5, 6, and 9 are increasingly subject to encroachment by the Ci into formerly rural areas. As a result, a shift out of potato production is occurr ing in these areas. Land values are increasing rapidly as the urban population gro and demands additional space for residential building. Suburban land is also demanded by individuals who seek the attributes of rural living while depending on employment in the city for their livelihood. Another factor influencing the shift out of production is soil type. Much of the land adjacent to the city is unsuitabl for the mechanization of potato production, particularly in harvesting. The cost reducing aspects of mechanization have been amply demonstrated. This area, therefo is at a distinct disadvantage to competing areas where mechanization is currently being adopted.

Census division 9 is rapidly going out of potato production. In the St. Andrews subdivision the shift is being delayed though the trend exists. In division 5 the provincial trend is in evidence. However, the St. Clements subdivisi has not shown any appreciable reduction in production area over the period.

Census division 6 shows a decided decline in production over the period, considerably greater than that of the province as a whole. In the Dufferin subdivision, however, there has been a substantial increase toward the end of the period. This subdivision includes the Carman area where soil type is the dominant

production factor. An increase also took place in the Portage la Prairie area toward the latter part of the period.

Division 1 as a whole follows the provincial trend. The Hanover subdivision, however, has had a decided increase in potato acreage over the period. This subdivision includes the Steinbach area where ease of transportation, an early season, a suitable soil type, and the ethnic background of the people combined to provide an environment favorable for expansion of production.

The decline in production in division 2 has been at a slower rate than for the province as a whole. This has been due to an increase in production in the Stanley subdivision which contains the Winkler-Morden-Haskett area. This is an extension of one of the major potato producing areas of North Dakota. Factors which encouraged this extension included the influence of American production techniques and a soil type suitable for their adoption and a gregarious farm population with a predilection for intensive agriculture.

In division 7 a relocation of production area has occurred. North Norfolk subdivision is rapidly increasing in production. Production in this area is expanding to meet the needs of the growing city of Brandon. A general decline has occurred in division 13 which includes Dauphin and Ethelbert.

Recent Surveys of Potato Producers in Manitoba

Since the last census year, 1956, there have been three local surveys concerned with potato producers. The 1957 and 1959 surveys were concerned with the whole population whereas the 1958-59 marketing season survey applied to a restricted group. The information gained from the population surveys is therefore comparable. The other survey is useful in a study of the farm organization of the respondents.

In 1957, a survey of the potato and vegetable producers was conducted by the Extension Service of the Department of Agriculture in cooperation with the Vegetable Growers Association. In this survey an enumerator visited all known growers in commercial production areas. Information was obtained on the growers location, the acreage and varieties of the crop grown, the types of storage facilities, fertilizer use, and the degree of mechanization. The data obtained from this limited survey represented the most complete information about the commercial grower population available up to that time. While there have been indications that the population was not completely covered, the omissions are not considered to bias the results unduly.

The recording of potato deliveries, as previously mentioned, during the 1958-59 marketing season provided a means whereby further knowledge was gained regarding commercial potato production. A detailed questionnaire was prepared and submitted to recording growers, the personal interview method being used. Of the sixty-five growers recording deliveries, thirty completed questionnaires. While the cooperators represented 46.2 per cent of the recorders, the acreage grown by them represented a much higher proportion of total potato acreage. This cannot be considered a representative sample of all growers because of the method of collection. This is borne out by analysis since certain attributes of producer operations indicate that the larger commercial operators are over-represented in the sample. The questionnaires were used primarily to determine the marketing costs of recording growers. However, information was obtained on their farm organization as well.

The inclement weather during the fall of 1959 caused a large proportion of the Manitoba potato crop to remain unharvested. In an effort to determine the extent of the loss to aid in the formation of Government policy, a crop loss survey was undertaken by the Extension Service using the mailed questionnaire method. Returns from the questionnaire were considered sufficiently complete to minimize bias.

These surveys enable some analysis of potato production and its marketing implications and from the 1957 and 1959 surveys an indication of production changes can be established. The Recording Office questionnaire provides an insight into the causes for the readjustment in production that is currently occurring between growers and areas.

CHAPTER III

PRODUCTION OF POTATOES IN MANITOBA

The 1957 Survey

From the information gathered in the 1957 survey a definite pattern of production is obtained which is similar to that obtained from published census data. Growers are classified in Table 4 according to acreage grown, storage capacity, fertilizer use, and mechanization.

This table reveals several factors which have implications for the current study. There were 307 growers in 1957 who grew a total of 6,151 acres of potatoes. There was a wide variation in the scale of operation between the respective growers with the result that a few large producers grew the major share of the total acreage. Thirty growers or, 9.8 per cent, grew 3,076 acres or 50.0 per cent of the total. Sixty-one growers, or 19.9 per cent, grew 4,104 acres or 66.7 per cent of the total. This compares with 18 per cent of the growers in 1945 who grew 59.3 per cent of the potatoes.[2/] The average size of the operation as determined in the 1957 survey was 20 acres, indicating an apparent increase in the concentration of production.

A total of 87 growers did not have any storage facilities. These growers produced 706.0 acres of potatoes. Of this acreage 217 were classified as planted t "early" potatoes. The remainder, or 489 acres, were planted to "late" potatoes. These growers were concentrated in the small acreage classes.

Fertilizer use can be used as an indication of the level of cultural practices. Controlled experiments indicate that substantial yield increases occur following the use of fertilizer and these increases in yield give substantial increases in net returns. However, only 77 growers applied fertilizer in 1957. The planted 2,768 acres or 45.0 per cent of the total. This indicates that the larger growers used relatively more fertilizer.

2/ Elliot, et. al., op. cit., p. 27

Table 4: Distribution, by Acreage of Potatoes, of Storage Facilities, Fertilizer Use and Mechanization, 307 Manitoba Growers, 1957*

Acreage Class	Number of Growers	Total Acres in Potatoes	Average Acres per Grower	Number of Growers with Storage	Total Storage (Thousand Bushels)	Storage per Acre (Bushels)
0 - 3.9	63	138	2.2	34	32	228
4.0- 9.9	93	546	5.9	58	72	132
10 - 24	90	1,363	15.2	71	229	168
25 - 49	31	1,028	33.2	29	175	171
50 - 74	17	970	57.1	15	268	277
75 -100	3	245	81.7	3	39	159
100 & over	10	1,861	186.0	10	438	235
All Growers	307	6,151	20.0	220	1,253	204

Acreage Class	Number of Growers Using Fertilizer	Acreage of Growers Using Fertilizer	Number of Rotobeaters	Number of Harvesters	Acreage with Rotobeater or Harvester
0 - 3.9	2	6	-	-	-
4.0- 9.9	22	137	3	1	27
10 - 24	25	409	11	-	225
25 - 49	11	378	10	-	317
50 - 74	7	385	6	3	330
75 - 99	2	165	1	-	90
100 & over	8	1,288	7	4	1,448
All Growers	77	2,768	38	8	2,437

* Source: From 1957 survey conducted by the Manitoba Department of Agriculture in cooperation with the Vegetable Growers Association of Manitoba.

Rotobeater and harvester ownership were taken as measures of mechanizatio in production. Thirty eight growers, or 12.4 per cent, reported having rotobeaters; eight growers, or 2.6 per cent reported having harvesters. These statistics indicate that up to this time relatively little mechanization of production had occurred.

Potato growers in this survey are also classified as full or part-time operators in Table 5. Part-time operators were defined as growers whose main source of income was from sources other than farming. A total of 57 part-time operators grew 453 acres of potatoes or 7.9 acres per farm on the average. The lack of dependence on farming for the major portion of their incomes by these growers has implications with respect to the risk factor in production which will be considered later in this report.

Table 5: Distribution, by Acreage of Potatoes, of 57 Part-Time Operators, Manitoba, 1957*

Acreage Class	Total Growers	Growers Potatoes Only	Growers, Vegetables and Potatoes	Acreage Vegetables	Acreage Potatoes	Total Acreage
0 - 3.9	25	16	9	39	57	96
4.0- 9.9	21	20	1	8	117	125
10 -24	7	5	2	31	97	128
25 -49	3	2	1	20	112	132
50 -74	1	-	1	35	70	105
75 -99	-	-	-	-	-	-
100 & over	-	-	-	-	-	-
All Growers	57	43	14	133	453	586

* Source: 1957 survey.

Another factor to consider is that of growers who produced vegetables in addition to potatoes. As is shown in Table 6, 104 potato growers also had an acreage devoted to vegetable production. This group of growers produced 1,272 acres of vegetables or 21.4 acres per farm. It will be observed that the size of the potato operation of this group was slightly above the average.

Table 6: Distribution, by Acreage in Potatoes, of 104 Potato Growers who also Produced Vegetables, Manitoba, 1957*

Acreage Class	Number of Growers	Acres of Vegetables	Acres of Potatoes	Total Acreage
0 - 3.9	21	89	49	138
4.0- 9.9	24	138	134	272
10 -24	36	411	551	962
25 -49	9	125	284	409
50 -74	10	397	590	987
75 -99	1	21	80	101
100 & over	3	91	539	630
All Growers	104	1,272	2,227	3,499

* Source: 1957 survey.

From the data obtained in this survey some generalizations can be made. There has been an increase over time in the average size of the potato enterprise. This is a desirable trend. However, the average size of the operation, 20 acres per grower, is undoubtedly much below the optimum size at which economies of scale permit the maximization of returns. There is, however, little information available on the optimum size of operation for the area. An Ontario study 3/ reveals that optimum size in that province is considerably greater than that of the average Manitoba operation. Growers, on the average, would appear to be operating on the declining phase of the economies of scale curve where cost per unit of output is decreasing. It is important that growers recognise this as their competitive position in the Winnipeg market is thereby weakened.

North Dakota producers have increased potato acreages to a size nearer to the optimum for minimum costs with the result that severe competition is given local growers on the Winnipeg market. Presently there is an import duty of 37½

3/ Abraham, F. R., Late Potato Production Costs, Farm Economics Branch, Ontario Department of Agriculture, 1957, p. 33.

cents per hundredweight on imports of potatoes from the United States. It is highly desirable and will ultimately be necessary for local growers to take advantage of the improved returns gained from the application of the duty to expand the scale of their individual operations in order to be competitive on the local market without this protection. They should not rely indefinitely on the protective effect of the duty but should use the opportunity available to render it unnecessary for the survival of the local industry by adopting the latest technology.

More adequate storage facilities are necessary. It will be recalled that 87 growers did not have storage facilities for their potatoes. These growers produced 216.5 acres of potatoes classified as "early". These potatoes would normally not require storage. However, these growers also produced 489.5 acres of varieties classified as "late". As a result these growers are in a weak bargaining position since these "late" potatoes have to be marketed before heavy frost sets in. This necessity to sell creates the potential for a market glut in the fall. At the same time there is an apparent relationship between the scale of operation and the possession of adequate storage facilities. In addition, the growers without storage are, in general, included in the part-time operator group. As a result, these growers are not primarily concerned with the effects of their operations in the market which may have serious repercussions to the detriment of the larger producers. A general increase in the scale of the individual operation would tend to put the industry on a sounder basis.

The survey also indicates room for improvement in the level of cultural practices. In addition, the possibilities for mechanization appear to be very great. Competing areas are much more highly mechanized and are continuing to press for further mechanical innovations. Local growers would be well advised to attempt

to close the gap caused by the lag of technology in this area.

The 1959 Crop-Loss Survey

As previously noted, a survey was conducted by the Extension Service in the fall of 1959 to determine the extent of the crop lost due to the adverse harvesting conditions. In this determination a mailed questionnaire was used. A response was obtained that was considered complete. A total of 375 growers indicated they produced potatoes in 1959. A comparison of the acreage grown by the respondents in 1959 with those in the 1957 survey is made in Table 7.

Over the two year period the number of growers increased by 68 and the acreage grown by 3,967 acres. The average acreage per grower increased from 20 acres to 27 acres. There has been a movement out of the 0-3.9 acre class toward those of higher acreage. In addition, the average acreage within the respective classes increased in all but one instance indicating an increasing average scale of operation. Growers producing 25 acres or more constituted 29.7 per cent of all growers and produced 78.7 per cent of the potato acreage in 1959 compared with 19.9 per cent and 66.7 per cent, respectively, in 1957. These statistics indicate that growers are responding to the economic forces favouring increasing scale.

In addition to changes in the scale of operation there have been changes in the relative importance of the various production areas as indicated in Table 8. The General Winnipeg area accounted for over one half the total acreage and approximately three quarters of all the growers in each of the two years. Outlying areas increasing their proportion of the total production over the period were the Carman area and the Brandon-Souris area. While production increased in the Altona-Winkler-Haskett area and in the Portage la Prairie area, the rate of increase was not proportional to that of all areas combined. Production in the Steinbach area actually declined. It may be noted that the average scale of operation is greater

Table 7: Distribution, by Acres of Production, of Manitoba Potato Growers, 1957 and 1959*

Acreage Class	Number of Growers		Total Acres		Average Acres per Grower		Per Cent of Total Acreage		Per Cent of All Growers	
	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959
0 - 3.9	63	45	138	103	2.2	2.3	2.2	1.0	20.5	12.0
4.0- 9.9	93	122	546	741	5.9	6.1	8.9	7.3	30.3	32.5
10 -24	90	97	1,363	1,512	15.2	15.6	22.2	15.0	29.3	25.8
25 -49	31	66	1,028	2,141	33.2	32.4	16.7	21.2	10.1	17.6
50 -74	17	25	970	1,467	57.1	58.7	15.8	14.5	5.5	6.7
75 -99	3	10	245	882	81.7	88.2	4.0	8.7	1.0	2.7
100 & over	10	10	1,861	3,272	186.0	327.2	30.2	32.3	3.3	2.7
All Growers	307	375	6,151	10,118	20.0	27.0	100.0	100.0	100.0	100.0

Table 8: Distribution, by Production Areas, Manitoba Potato Growers, 1957 and 1959*

Production Area	Acreage		Number of Growers		Per Cent of Total Acreage		Per Cent of All Growers		Average Acres per Grower	
	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959
General Winnipeg	3,191	5,708	229	299	51.9	56.4	74.6	79.7	13.9	19.1
Altona-Winkler -Haskett	917	1,368	7	6	14.9	13.5	2.3	1.6	130.9	228.0
Steinbach-St. Anne	534	475	28	29	8.7	4.7	9.1	7.7	19.0	16.4
Brandon-Souris	238	714	8	6	3.9	7.1	2.6	1.6	29.8	119.0
Carman	524	1,035	4	7	8.5	10.2	1.3	1.9	131.0	147.9
Portage la Prairie	586	621	24	22	9.5	6.2	7.8	5.9	24.4	28.2
Other Areas	161	197	7	6	2.6	1.9	2.3	1.6	23.1	32.8

* Sources: 1957 and 1959 surveys.

outside the General Winnipeg area.

Distance from the Winnipeg market has an influence on the scale of production. If those areas one hundred miles and over are not considered, these areas in general depending on markets other than Winnipeg, there is an increasing size of operation with increasing distance from the city, Table 9.

In 1957 the average acreage per grower in the 0-24 mile area was 13.8 acres while in 1959 this had increased to 18.5. However, the rate of increase was much greater in those areas 75 miles or more distant from Winnipeg. This lends support to the hypothesis that factors other than transportation are assuming a more important position in the location of production.

The Population of Potato Growers

There were movements in and out of production by growers as well as changes in scale among them as is shown in Table 10. Of the 307 growers recorded in 1957 only 155 remained in production in 1959. Therefore, there were 220 new growers operating in the field in the latter year while 152 had discontinued production. The growers remaining over the period produced 4,575 acres or 74.4 per cent of all the potatoes in 1957 compared with 5,793 acres or 57.2 per cent in 1959. It will be observed that these growers had increased their production by 1,218 acres or 27 per cent. The acreage grown by this group in 1959 was equivalent to 94.2 per cent of the total acreage grown in 1957.

While growers within all acreage classes, except that of 75-99 acres, registered increases in acreage on the average over the period, the major change was in the 0-3.9 acre group. The average acreage per grower within this group increased over two and one half times. This indicates that growers do not feel justified in remaining in production with less than four acres.

Table 9: Distribution, by Distance from Winnipeg, Manitoba Potato Growers, 1957 and 1959*

Approximate Distance from Winnipeg (miles)	Acreage		Number of Growers		Average Acres per Grower		Per Cent of Total Acreage		Per Cent of All Growers	
	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959
0-24	3,229	5,790	234	313	13.8	18.5	52.5	57.2	76.2	83.5
25-49	495	393	23	15	21.5	26.2	8.1	3.9	7.5	4.0
50-74	1,110	1,656	28	29	39.6	57.1	18.0	16.4	9.1	7.7
75-99	917	1,368	7	6	130.9	228.0	14.9	13.5	2.3	1.6
100 & over	400	911	15	12	26.6	75.9	6.5	9.0	4.9	3.2

Table 10: Changes in Acreage, 155 Manitoba Potato Growers, 1957 and 1959*

Acreage Class (1957)	Number of Growers	Acreage		Average Acreage		Proportional Change (Per Cent)
		1957	1959	1957	1959	
0- 3.9	16	39	137	2.4	8.6	+258
4.0- 9.9	39	244	344	6.3	8.8	+ 40
10 -24	54	806	998	14.9	18.5	+ 24
25 -49	20	685	828	34.3	41.4	+ 21
50 -74	14	795	932	56.8	66.6	+ 17
75 -99	3	245	237	81.7	79.0	- 3
100 & over	9	1,761	2,317	195.6	257.4	+ 32
All Classes	155	4,575	5,793	29.5	37.4	+ 27

*Sources: 1957 and 1959 surveys.

This continuing group of growers possess what may be considered the characteristics of the typical commercial grower. This tenacious segment of the industry is composed in general of growers having adequate storage facilities and following proper production techniques and who also are operating on a sufficient scale to warrant a degree of mechanization. The large growers and the seed producers are included in this group.

A somewhat larger group of transient growers exists outside this stable core. The presence of this group causes considerable problems within the industry. Growers within this group are relatively poorly informed, inadequately equipped and appear to hold the idea that conditions which occur in one year will be repeated the next. In the past their activities have been favoured by ease of entry into the small scale operation typical of the group. In addition, many individuals have an inherent love of the soil and feel that potato production will satisfy this urge even though the operation is not sound financially.

These unstable producers affect the potato market adversely to the detriment of the established growers. Their general lack of knowledge of the market renders them subject to exploitation. Often the basis of sale is not the result of the normal interaction of market forces. However, the prices obtained tend to determine the market price for the whole output. In addition, the activities of the group tend to accentuate market swings, in that entry is made following a "good year" and exit made after a "poor year". This works to the disadvantage of specialists in the field. A further problem attached to this group is the difficulty of administering effective extension programs. Much effort is expended by extension personnel to encourage the adoption of production techniques that lead to improvements in quality and in marketing generally. With the rapid turnover of potato growers a considerable portion of this effort is wasted. This tends to obscure any improvements resulting from the extension program. A prerequisite to an efficient program is the stablization of the population of potato growers.

1959 Questionnaire

(a) Technology

Many of the potato marketing problems are a reflection of the conditions under which the product is grown; in other words, problems originating with production become obvious in marketing. Considerable progress has been made in solving some of these problems and much attention is being given to others. Unfortunately many of the difficulties facing growers arise from the original pattern of development and this tends to retard the required adjustments. An elementary study of the farm organization of a sample of potato growers was possibl from the questionnaires obtained from the cooperators in the recording of deliveri during the 1958-59 marketing season. These growers represent the progressive commercial segment of the industry.

(b) Land Use

Many of the difficulties encountered by growers are associated with the type of soil on which potatoes are produced. Nearly one half the potatoes are grown on a soil of a clay texture as indicated in Table 11. Clay soils tend to adhere to the tubers in harvest, particularly under wet conditions, giving rise to an unattractive product unless washed. In addition, this soil does not lend itself to mechanical harvesting due to its lumping characteristic when dry and stickiness when wet. The use of these soils arises from the historical location of production around the city of Winnipeg. Relocation to other more desirable areas has been slow in the past due to social factors but there are presently indications that this obstacle is being overcome with a subsequent acceleration.

Responses to the questionnaire indicated that a wide range of soil types were used in the production of potatoes. To facilitate the determination of the soil type used in production the locations of the various fields were recorded on

Table 11: Major Soil Types Used for Potatoes, 30 Manitoba Growers, 1958*

Suitability Class a/	Soil Type b/	Acres	Per Cent of Total Acreage
Excellent	Portage Association	40	2.0
(high yields,	Riverdale	83	4.2
good quality)	Sparling Association	70	3.5
	Altona Fine Loam	388	19.6
Good	Almassippi Very Fine Sandy Loam	70	3.5
(low yields,	Altona Light Sandy Loam	308	15.6
good quality)	Pelan Sandy Loam and Sandy Clay Loam	46	2.4
	Poppleton Sand and Sandy Loam	7	0.4
Fair	Zora Loam to Sandy Clay Loam	25	1.3
(high yields,	St. Norbert Clay	103	5.2
poor quality)	Marquette Clay	6	0.3
	Red River Clay	555	28.1
	Semple Clay	177	8.9
Poor	Osborne Clay	99	5.0
(low yield,			
poor quality)			

* Source: 1959 questionnaire.

a/ Classification of suitability for potato production courtesy E. A. Poyser, Soils and Crops Branch

b/ Reconnaisance Soil Survey Maps of the Manitoba Soil Survey.

a map and this in turn related to the soil maps of the respective areas. The types of soil used indicate that a relocation of the production area in many instances is essential for an enduring industry. The emphasis must be on quality to enable the local product to compete favourably in the market place. A large proportion of Manitoba potatoes, 48.8 per cent, is presently grown on soils which tend to produce a poor quality product. On the other hand 21.9 per cent is grown on soils which produce a product of a good quality but with a low yield. On these soils the economics of production need to be carefully considered. The remainder or 29.3 per cent of the production, occurs on soils having the potential for high yield and good quality while at the same time possessing the physical characteristics necessary for the adoption of mechanization. While no definite statistics are available, observation indicates that production is being shifted to these soils. A policy designed to foster this movement would be well advised.

(c) Cultural Practices

While a large proportion of the potatoes are produced on soils which lack the physical characteristics desirable for potato production, little effort is being made to improve them through adequate crop rotations. Of the 30 respondents, only 8 included any soil improvement crops in their rotations in 1958. With a total of 6,286 cultivated acres in the group, only 91 acres, or 1.5 per cent, were devoted to such crops in that year. On a per farm basis, slightly over 3 acres were in such crops. For the group as a whole it would have taken over 200 years for a complete rotation to have occurred. Growers who planted these crops in 1958 for use the following year numbered 11 and the acreage had increased to 184 or 2.9 per cent of the total cultivated acreage. This is an improvement but the progress required has scarcely begun. The lack of these crops may be attributed in part to the small livestock population on these farms. In 1958, 16 out of the 30 farms had no livestock while the average livestock population per farm was 5.0 animal units.

The total potato acreage of the sample was 1,977 acres or an average of 55.9 acres per grower. The equivalent of 28,636 75-pound bags of seed were used of which 20,849 were certified. Eleven growers did not treat their seed for seed borne diseases. Nine growers failed to use fertilizer on their potato fields. The 21 growers who fertilized tended, on the average, to use the complete fertilizer, 10-32-10, with the occasional individual using heavy applications of barnyard manure.

A crop protection program was followed by all those in the sample. Seventeen growers used a spray system, 9 dusted and 4 used a combination of the two. The intensity of the program varied greatly between growers, the chemical cost ranging from $0.80 to $31.48 per acre. On the average, the crop protection program could be substantially improved. This is important since one of the major complaints in the past from all sections of the trade, that of tuber breakdown resulting from late blight infection, arises from inadequate protection from infection by this fungus disease.

(d) Storage Capacity

Growers in this sample are progressively providing themselves with storage facilities, as shown in Table 12. From a marketing standpoint this is an important development. With proper facilities, a uniform marketing policy can be adopted that is independent of weather conditions. As will be considered in detail later in this report, this group were able to follow a systematic marketing program during the 1958-59 marketing season. Above and below ground storages specifically designed for potatoes accounted for approximately 97 per cent of the storage capacity possessed by the group with the remaining 3 per cent being provided by basements.

Table 12: Changes in Storage Capacity, 29 Manitoba Potato Growers, 1949-1957

Year	Bushels of Storage Capacity
1949	58,385
1950	58,385
1951	109,124
1952	143,635
1953	181,260
1954	184,385
1955	204,435
1956	310,685
1957	383,435

* Source: 1959 Questionnaire.

(e) Mechanization

A wide variety of equipment was used by the growers within the sampl Twenty-eight of these growers possessed 202 pieces of specialized potato equip in 1958 which included 16 seed cutters, 32 planters, 29 sprayers and dusters, 17 rotobeaters, 30 diggers, 7 harvesters, 27 bulk wagons, 15 elevators, 16 grad and 13 sack loaders. Ninety-nine of these machines had been on the respective farms for five years or more. This indicates a probable interim increase in mechanization but the precise extent of the increase could not be determined be no record was taken of machine sales by these growers during the period. Howev owing to the recent design of much of the equipment, machines reported would ap to be replacements. Mechanization has proceeded at a faster rate in pre-harves and post-harvest operations than in harvesting itself. This no doubt is a refl of the soil type used and the scale of operations of the individual growers.

(f) Importance of Labour

The intensive nature of potato production necessititates the use of a large labour force. The sample of 30 growers required a total of 121.6 man equivalents in their operations. The growers and their families provided 47.8 equivalents or 39.3 per cent, while the remaining 73.8 man equivalents of labour, or 60.7 per cent, were hired. Thirteen man equivalents were provided by labour hired by the year and 60.8 man equivalents by day labour.

Total wages paid by the group totalled $158,944 in 1958 or an average of $5,298 per grower. The average annual wage paid, including the value of perquisites was $2,231. The average wage paid by the day was $6.85. This was equivalent to an annual wage of $2,137. While these labour costs cannot all be allocated to the potato operation due to the additional enterprises of these growers, which on the average included 85.9 acres of grain, 25.4 acres of summer-fallow, and 15.7 acres of other vegetables, they represent one of the major costs in production and are a driving force behind mechanization.

(g) Yield

Yield is the result of a combination of production practices and weather conditions. However, similar weather conditions applied to all growers in the survey due to the limited area from which the sample was drawn. As a result, the variations in yield may be considered to be primarily due to differences in production techniques. The relationship of size of operation to yield is illustrated in Table 13.

There is a tendency for yield to increase with scale of operations. This phenomenon has been recorded in studies in other areas and may be explained by the increasing specialization that occurs with increasing scale. In an Ontario

Table 13: Effect of Size of Operation on Yield, 30 Manitoba Potato Growers, 195

Acreage Class	No. of Growers	Acreage	Production (Bushels)	Yield (Bushels per acre)
0-19	5	79	11,864	150.2
20-39	9	252	44,788	177.7
40-59	9	422	79,701	188.9
60-79	2	128	26,438	206.5
80 and over	5	1,096	314,660	287.2
All Classes	30	1,977	477,451	241.6

* Source: 1959 questionnaire.

study 4/ yields were found to be directly associated with net returns per acre. If this applies here, it is obvious that the growers in the sample are better situated economically than the average Manitoba producer since the respective average yields in 1958 were 241.6 and 128.0 bushels per acre.

(h) Types of Potatoes Grown

Many varieties of potatoes are grown in Manitoba. However, these varie may be classed into three main types, red, white, and russet. Red potatoes are desired by the retail trade because of their attractive appearance in consumer packages. On the other hand, since white potatoes lack this attribute, production of this type is discouraged except for varieties having high quality for processi purposes. Russet potatoes are associated with quality at all levels of the trade and tend to command a premium on the market.

4/ Abraham, F. R., op. cit. p. 20.

Table 14: Classification of Types of Potatoes Grown, by Acreage, 24 Manitoba Growers, 1957 and 1958*

Type	Acreage		Proportion of Total Acreage (Per Cent)	
	1957	1958	1957	1958
Red	726	948	63.2	79.3
White	230	78	20.0	6.5
Russet	192	170	16.8	14.2
All Types	1,148	1,196	100.0	100.0

*Sources: 1957 survey and 1959 questionnaire.

The relative importance of each type of potatoes grown and the shifts between types for 24 growers who completed the questionnaire and had recorded this information for the 1957 survey are shown in Table 14. Over the period the acreage devoted to the red type increased from 63.2 per cent to 79.3 per cent of the total acreage grown by the group. A decided decline from 20.0 per cent to 6.5 per cent occurred in the case of the white type. Production of the russet type was relatively stable, composing 16.8 per cent of the total acreage in 1957 and 14.2 per cent the following year.

(i) Attitude of the Growers

The question "Are you increasing or decreasing your potato acreage over time?" was asked the growers completing the questionnaire. Fourteen growers indicated plans for increasing acreage, an equal number anticipated no change and two were decreasing their acreage, as is shown in Table 15. Growers increasing their acreage were predominately specialists having an average acreage of 94.4. On the other hand growers indicating stability had an average acreage of 41.4 while those going out of production had an average of 37.5 acres.

Table 15: Production Decisions in Relation to Acreage, 30 Manitoba Potato Growers, 1959*

Acreage Class	Number in Class	Decision		
		Increase Production	Decrease Production	Stability
0-19	6	2	0	4
20-39	8	4	1	3
40-59	9	5	1	3
60-79	2	0	0	2
80 and over	5	3	0	2
All Classes	30	14	2	14

* Source: 1959 questionnaire.

Various reasons were given by growers for their decisions. All growers increasing their production considered unit costs would be reduced by so doing. One grower also considered advantage should be taken of an expanding market. Growers decreasing production were doing so for involuntary reasons. Of those growers indicating stable production, four felt they were unable to expand their operations because of inadequate storage facilities and four had insufficient land. Five other growers considered their scale of operation was the optimum for their respective conditions. In one case price risk was thought to be sufficiently great to deter expansion. Two growers also indicated concern with labour problems.

It is apparent from these replies that commercial growers are primarily concerned with production problems with less thought being given to those relating to marketing. In the sample only one grower was concerned with the market outlet for the product. One additional grower was concerned with the price risk in the market, a subject to be investigated in some detail in this report. Growers are preoccupied with their individual production problems, probably to their own detriment, since insufficient attention is given to the solution of problems

requiring group action. This arises from the historical pattern of the industry, composed as it is of small, highly individualistic units. With the increasing scale of the individual operations this attitude is slowly changing. This is borne out by the recent actions of growers in organizing at the policy level in the Vegetable Growers Association and at the marketing level in a cooperative sales organization. Both these organizations are becoming increasingly virile as the relative importance of the small production unit recedes.

Production Costs

This study is primarily concerned with marketing. However, a knowledge of the other costs at the farm level is a requisite to an understanding of the relative importance of market margins and price variations. As previously mentioned, growers tend to confine their efforts largely to endeavouring to reduce their individual production costs as a means of increasing income rather than to improving their returns by collective action. There are at least two possible causes for this: either production costs constitute the major proportion of the total costs at the farm level or growers are not yet convinced that greater returns can be achieved by group action.

Three growers cooperated with the study by making available their farm business records for the calendar year 1959. These records were used for estimating the costs involved at the farm level by the potato enterprise for the 1959-60 crop year. The 1959 season should not be considered typical since much of the crop could not be harvested due to inclement fall weather. These three growers were able to harvest on the average 49 per cent of the crop whereas the provincial average was 50 per cent. The respective growers had different types of business organization One relied on custom work for a large share of his operations, another performed the operations entirely by himself whereas the other used a combination of the two methods. The three growers involved followed recommended production practices more

closely than the typical grower and as a result the costs experienced by these operators may be comparatively lower.

To determine the total farm costs of the potato enterprise for the 1959-60 season it was necessary to pro-rate certain of the expenses since the records related to the calendar year 1959. These costs involved storage, grading, and shipment, functions considered as relating to marketing. In addition, due to the crop loss experienced in 1959, a determination was made in Table 16 of the costs that would have been incurred provided the total crop was harvested as well as the costs actually experienced.

Table 16: Unit Production and Storage Costs of the Potato Enterprise, 3 Manitoba Growers, 1959*

Operation	Cost per Acre (Dollars)		Cost per Bushel [a] (Dollars)	
	Actual	Pro-rated [b]	Actual	Pro-rated [b]
Planting	48.97	48.97	.40	.22
Cultivation	9.59	9.59	.08	.04
Crop Protection	10.68	10.68	.09	.04
Top Killing	1.26	1.26	.01	.01
Harvesting	17.34	29.27	.15	.13
Warehousing	50.08	89.70	.41	.39
Rent	5.08	5.08	.04	.02
Overhead	11.29	11.29	.09	.05
All Operations	154.29	205.84	1.27	.90

* Source: Analysis of business records.

[a] Based on a yield of 227.5 bushels per harvested acre.

[b] Costs which would have been incurred if harvesting had been completed.

Farm costs are comprised of fixed costs and variable costs. A breakdown of potato production costs into fixed and variable costs is given in Table 17. Fixed costs are those which are incurred irrespective of the level of production and are non-adjustable on the short run with the result that unit fixed

costs decline with production increases. On the other hand, variable costs are largely determined by the scale of operation and may or may not decrease on a unit basis with increasing scale. Fixed costs are of considerable significance in commercial potato operations. The capital investment in equipment and storage facilities is high, involving considerable service charges for interest, depreciation and insurance. Variable costs are also high due to the intensive nature of the potato operation. Fixed costs were estimated to represent 16.3 per cent of the total farm costs. The fullest possible use must be made therefore of these fixed expenditures if the total cost is to be minimized.

Table 17: Fixed and Variable Farm Costs, 3 Manitoba Potato Growers, 1959*

Operation	Fixed Cost		Variable Cost	
	Cost per Acre (Dollars)	Proportion of Total Cost (Per cent)	Cost per Acre (Dollars)	Proportion of Total Cost (Per cent)
Planting	1.07	0.5	47.90	23.3
Cultivation	.91	0.4	8.68	4.2
Crop Protection	1.01	0.5	9.67	4.7
Top Killing	.79	0.4	.47	0.2
Harvesting	5.70	2.8	23.57	11.4
Warehousing	12.82	6.2	76.88	37.4
Rent	-	-	5.08	2.5
Overhead	11.29	5.5	-	-
Total	33.59	16.3	172.25	83.7

* Source: Analysis of business records. Costs are calculated assuming harvesting was complete at the same yield as obtained on area actually harvested.

Planting costs are made up of those relating to land preparation, purchase of seed, seed cutting and treatment, purchase of fertilizer and the actual planting operation. Cultivation relates to soil tillage operations following planting, involving usually a post-planting harrowing followed by weeding and in-row cultivations. Crop protection costs are composed of the cost of insecticides and fungicides and their application. The cost of top killing for the three growers

applies to the use of mechanical top destroyers. Harvesting costs are those relating to digging, loading and transporting potatoes to storage. Warehousing costs include the storage, grading and sacking, and also the shipment of the potatoes. These costs relate to marketing and will be so considered in this study. The relative proportions of the respective costs are recorded in Table 18.

Table 18: Total Farm Costs of the Potato Enterprise, 3 Manitoba Growers, 1959*

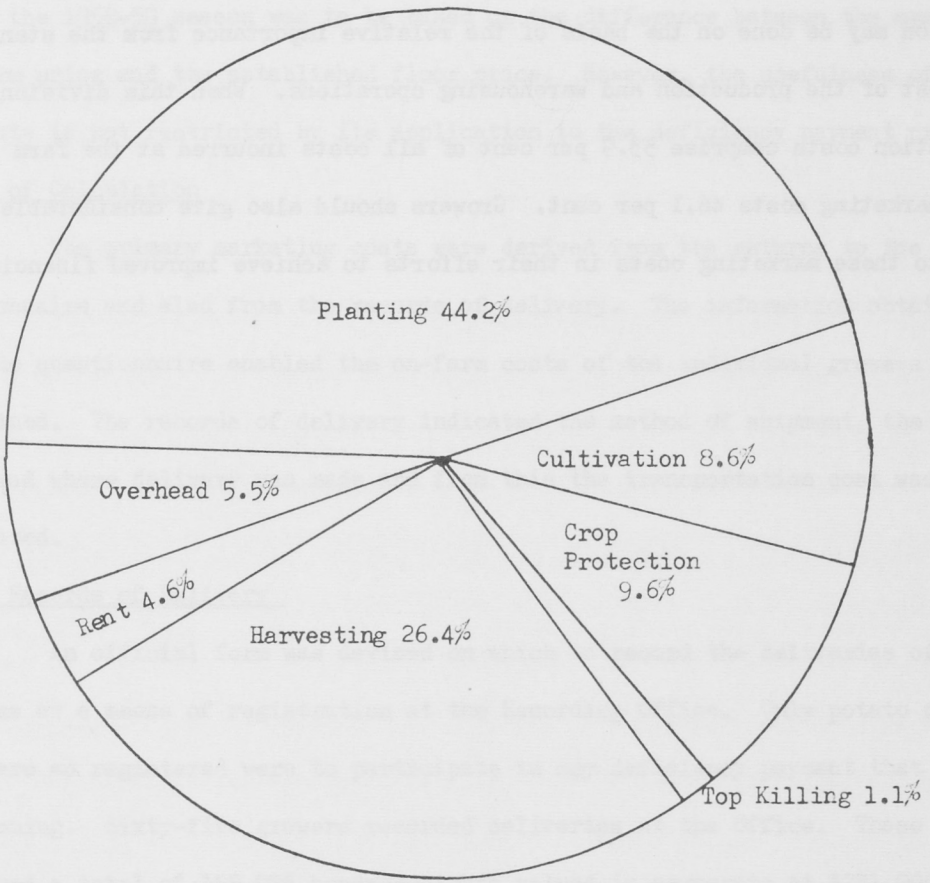
Operation	Farm Cost		Proportion of Total Cost	
	Actual (Dollars)	Pro-rated[a] (Dollars)	Actual (Per cent)	Pro-rated (Per cent)
Planting	50,000.56	50,000.56	31.8	23.8
Cultivation	9,791.29	9,791.29	6.2	4.7
Crop Protection	10,899.80	10,899.80	6.9	5.2
Top Killing	1,284.49	1,284.49	0.8	0.6
Harvesting	17,704.00	29,885.15	11.2	14.2
Warehousing	51,139.74	91,591.52	32.5	43.5
Rent	5,185.00	5,185.00	3.3	2.5
Overhead	11,527.27	11,527.27	7.3	5.5
Total	157,532.15	210,165.08	100.0	100.0

*Source: Analysis of business records covering 1,021 acres of potatoes.

[a] Pro-rated costs are those which would have been incurred if harvesting had been completed.

It is apparent from Chart 9 that when the decision is made to produce potatoes, the major outlay occurs at the outset for planting costs, made up principally of expenditures on seed and fertilizer; and also for rent of the land used. Subsequent expenditures for weed control and crop protection are relatively minor. Growers often endeavour to minimize these costs in an effort to reduce their cost of production. However, considerable risk is involved in following such a course since adequate weed control and crop protection are essential for high yield and good quality, two of the requisites for maximizing net returns. Since the cost of these operations is small in relation to the risk involved,

CHART 9: PROPORTIONAL PRODUCTION COSTS, 3 MANITOBA GROWERS, 1959*



* Source: Calculated from data in Table 18 excluding warehousing costs.

minimizing the expenditures on these cultural practices is probably ill-advised. In preference, attention should be directed toward improving the efficiency of planting and harvesting operations due to their greater relative cost.

Overhead costs may be allocated between those operations involved in production and those concerned with warehousing or marketing at the farm level. This division may be done on the basis of the relative importance from the standpoint of cost of the production and warehousing operations. When this division made production costs comprise 53.9 per cent of all costs incurred at the farm level and marketing costs 46.1 per cent. Growers should also give considerable attention to these marketing costs in their efforts to achieve improved financial returns.

CHAPTER IV

PRIMARY MARKETING COSTS 5/

ose of Determination

The original purpose of the calculation of the primary marketing costs to enable the net return received by the grower at the farm to be determined. was necessary since any deficiency payment that might be made on marketings ng the 1958-59 season was to be based on the difference between the average farm price and the established floor price. However, the usefulness of the ; data is not restricted by its application to the deficiency payment program.

hod of Calculation

The primary marketing costs were derived from the returns to the 1959 stionnaire and also from the records of delivery. The information obtained n the questionnaire enabled the on-farm costs of the individual growers to be ermined. The records of delivery indicated the method of shipment, the shipping nt and where delivery was made and from this the transportation cost was culated.

of Records of Delivery

An official form was devised on which to record the deliveries of atoes as a means of registration at the Recording Office. Only potato deliveries t were so registered were to participate in any deficiency payment that might be thcoming. Sixty-five growers recorded deliveries at the Office. These growers livered a total of 158,986 hundredweights valued in aggregate at $231,096.51. irty of these growers completed the questionnaire previously mentioned and 28 of e returns were used in various phases of the marketing cost analysis. These 28 owers, whose returns were used, made 53 per cent of the total sales recorded at

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5/ The calculations of the primary marketing costs were made by E. Afful, aduate student, Department of Agricultural Economics, University of Manitoba. r further detail on the calculation of these costs refer to his unpublished thesis, Study of Primary Marketing Costs for Manitoba Potatoes, April, 1960.

the Office and had 1,926 acres planted to potatoes in 1958.

Grower participation in the recording of deliveries was incomplete. A degree of inconvenience was involved in the system of recording used and this may have been one of the causes for the lack of cooperation. In addition, there is reason to believe a measure of personal antagonism to the recording existed on the part of some growers. The records indicated that most of the large growers participated while, in general, the small growers did not. This may have been a reflection on the system which favored recording of deliveries to the wholesale trade.

Recording Population

From the replies to the questionnaire it was possible to obtain an insight into the farm organization of the recording population. While only 30 of the 65 growers completed the questionnaire, these grower operations may be considered typical for the group. There were an average of 242 acres per farm which included 66 acres of potatoes, 86 acres of grain and 25 acres of summer-fallow. In addition, an average of 16 acres of vegetables were grown. Of the man equivalents of labour used on the average farm, 1.59 were supplied by the grower and his family and 2.46 were hired. It is obvious the recording populati was composed of growers above average in scale of operation compared to growers large.

Volume of Potatoes Delivered

A total delivery of 158,986 hundredweights was recorded by the Office during the October to April period. The average delivery per grower recording w 2,446 hundredweights valued at $3,555.33. There were 16 growers above the avera in volume of delivery and these growers delivered 115,649 hundredweight or 72.7

cent of the volume marketed and received $167,565.72 or 72.5 per cent of the urns. There was no significant difference in the price received between the ve average growers in size of delivery, or in other words, there was nothing support the thesis that growers delivering larger volumes received higher prices. difference that did exist was in favour of the grower delivering the smaller ume.

e of Package Delivered

Four sizes of containers were used in the delivery of the potatoes. ese were the 50, 75 and 100 pound jute sacks and the 25 pound paper bag. The 25 nd units were retail containers while those of larger size were used at both the olesale and retail level. The relative importance of the various sizes of livery packages is illustrated in Table 19. The 75 pound jute sack was the most

ble 19: Deliveries of Potatoes by Size of Container, 65 Manitoba Growers, 1958 and 1959*

Size of Container (Pounds)	Volume Delivered (Hundredweight)	Proportion of Total (Per cent)
25	49	0.3
50	3,829	3.0
75	142,612	88.7
100	12,496	8.0
All sizes	158,986	100.0

*Source: Records of delivery from the Winnipeg Recording Office.

opular container. Part of its popularity is due to its suitable size for ease of andling by a man. The 25 pound units could be considered largely experimental. hese few bags could be considered to be some of the first pre-packs at the farm evel. With some of the larger growers installing washing and packaging facilities

the proportion of the deliveries made in these retail containers will increase in the future.

Grades and Grade Differentials

Two grades, Canada No. 1 and Canada No. 2 are commonly used to describe potatoes in this province. However, any deficiency payment that might be made to apply to No. 1 potatoes only. This caused very few deliveries of No. 2 potatoes to be recorded. Price variation between lots classified as No. 2 grade was extensive which inferred that a wide range of quality was included. As a result a comparison of returns received by the grades marketed was considered unjustified since it would not have any statistical significance. The observation may be made that grades as commonly applied include an excessive range of quality which allows a lack of precision in price determination.

Varieties Delivered

The records of delivery indicated that growers sold eleven different varieties of potatoes. The principal varieties sold were the Red Pontiac and the Netted Gem. The varieties are grouped in Table 20 into three general types; red, white and russet, on the basis of the external appearance of the tubers.

Table 20: Types of Potatoes Delivered, 65 Manitoba Growers, 1958 and 1959*

Type	Quantity (Hundredweight)	Invoice Amount (Dollars)	Average Price (Dollars)	Proportion of Total (Per cent)
Red	133,420	191,146.11	1.43	83.9
White	5,698	8,125.47	1.43	3.6
Russet	19,868	31,824.93	1.60	12.5
All Types	158,986	231,096.51	1.45	100.0

*Source: Records of delivery.

average market price was the same for the red and the white types. An average nium of $0.17 per hundredweight was paid for the russet type. While this nium exists, the net return for this type cannot be considered greater since variation in production costs per hundredweight between the types is unknown, ugh experience indicates that red and while types have a lower unit cost than set types.

st Receivers

In the aggregate 91 per cent of the recorded sales were to wholesalers h the balance going to other outlets. This distribution was incomplete since method of recording used apparently favoured grower deliveries to the whole- ler section of the trade. Additional outlets were dealers, retailers, roadside nds and peddling. All the potatoes were sold on a graded basis. The stribution of sales by outlets as estimated by a sample of growers is recorded Table 21.

ble 21: Grower Sales of Table-Stock Potatoes by Type of Outlet, 30 Manitoba Growers, 1958 and 1959*

Outlet	Volume (Hundredweight)	Proportion of Total (Per cent)
Wholesaler	161,764	89.2
Dealer	3,600	2.0
Retailer	2,400	1.3
Institution	934	0.5
Roadside Stand	11,770	6.5
Peddling	845	0.5

*Source: 1959 questionnaire.

This sample of growers did not anticipate delivering any potatoes to processors during the 1958-59 marketing season. In addition to the volume of table-stock potatoes indicated, these growers also anticipated sales of seed potatoes totalli 106,263 hundredweights or 37 per cent of their total sales.

Time of Deliveries

There has been considerable criticism of growers in the past by the trade because they failed to provide the market with a uniform supply over the marketing season. An analysis of the delivery records indicates that for the gro of recording growers sales were greatest during the months of December, January a February as shown in Table 22. This is in contrast to the general pattern of

Table 22: Deliveries of Potatoes by Months, 65 Manitoba Growers, 1958-59*

Month	Volume Delivered (Hundredweight)	Value (Dollars)
October	24,189	32,095.93
November	23,536	34,400.34
December	28,302	43,161.79
January	37,347	54,743.26
February	29,058	42,312.24
March	14,478	21,235.65
April	2,076	3,147.30

* Source: Records of delivery.

delivery which has prevailed in the past[6/] and indicates that the growers recording ha provided themselves with adequate facilities for winter shipment. Shipments decli

6/ See Chapter 6.

March and April due to the completion of deliveries by many growers.

thods of Shipment

Recording growers delivered most of their potatoes to market in their own trucks as indicated in Table 23. These units ranged from one ton farm trucks to fairly large specialized units. Considerable quantities of potatoes were also delivered by P.S.V. trucks. This method of delivery was used by some large growers a distance from the city. In addition, many potatoes were shipped by rail. While sales of these potatoes were made through the Winnipeg market, actual delivery was made to other provinces. In a few cases buyers picked up the potatoes at the farm.

Table 23: Method of Delivery of Potatoes, 65 Manitoba Growers, 1958-59*

Method	Volume Delivered (Hundredweight)	Proportion of Total (Per cent)
Grower's Truck	96,321	60.6
P.S.V. Truck	40,601	25.5
Rail	21,430	13.5
Buyer's Truck	634	0.4

* Source: Records of delivery.

torage Costs

Storage is of considerable economic importance in marketing. Potatoes are stored by growers for several reasons among whichare, to extend the length of the marketing season for the local product, to supply the market more uniformly, to increase net returns, and to enable the work load to be spread over a longer period. In a sample of 30 growers in 1959, out of a total production of 286,470 hundredweight, 231,934 hundredweight or 81 per cent were stored.

Proper storage is expensive to provide, accentuated in this area by th wide variations in weather conditions which must be overcome. Storage requiremen for a minimum loss of product are critical. Storage losses result from loss of weight and quality. Dr. Smith describes storage losses as follows:

"Potatoes shrink or lose weight during storage. This weight loss is comprised of water loss from the tubers, carbon dioxide loss and decay losses as result of rot organisms. The amounts of these losses are determined by storage conditions such as temperature, humidity, evaporating power of the air, compositi and movement of the air and the maturity and condition of the potatoes at time of storage".

The provision of adequate storage to minimize these losses entails the investment of a large amount of capital in relation to the value of the product stored.

Manitoba growers use four types of storage; above ground, below ground, basement and rented. Below ground storage and basements have been used in the pa for storage but are now being superseded by above ground units. These latter storages facilitate more convenient handling and at the same time lend themselves easier control of temperature and ventilation. A sample of 28 growers in 1959 ha total storage capacity of 229,688 hundredweights of which 112,125 hundredweights were above ground, 110,475 were below ground, 5,213 in basements and 1,875 in ren premises. Returns from 23 growers were used to estimate typical storage costs. determining these costs allowance was made for depreciation, maintenance and inte on investment. Above ground storage was slightly more expensive than below groun per unit stored, $0.079 as compared to $0.072 per hundredweight and a weighted average cost of $0.076.

1/ Talburt, W. F. and Smith, D., Potato Processing, A.V.I. Publishing Co Westport, Conn., 1959. p. 164.

Table 24: Costs and Returns for Storage of Potatoes, Manitoba, October 1958 - April 1959.

(Dollars per hundredweight)

Month	Price at Start of Period	Fixed Storage Cost	Shrinkage Loss in Storage	Interest on Investment in Potatoes	Total Storage Cost	Storage Cost Plus 1.35	Price Received for Potatoes	Net Storage Return
Oct.	1.35	.08	-	-	.08	1.43	1.35	-.08
Nov.	1.35	.08	.01	.01	.10	1.45	1.45	0.
Dec.	1.35	.08	.02	.01	.11	1.46	1.50	.04
Jan.	1.35	.08	.03	.02	.13	1.48	1.49	.01
Feb.	1.35	.08	.05	.02	.15	1.50	1.46	-.04
Mar.	1.35	.08	.06	.03	.17	1.52	1.50	-.02
Apr.	1.35	.08	.07	.03	.18	1.53	1.62	.09

* Source: Records of delivery and 1959 questionnaire.

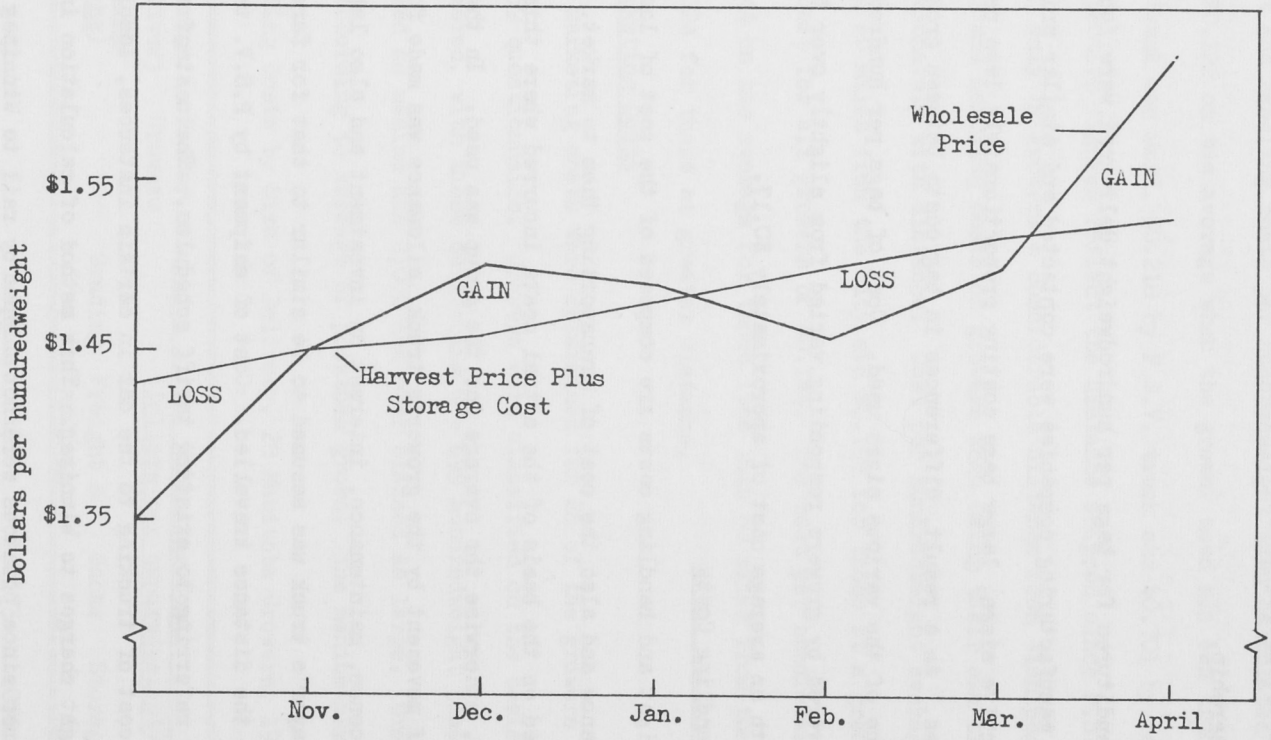
From the cost and return figures it was possible to estimate the net returns from storage over the 1958-59 marketing season. An allowance of 5/6 of 1 per cent per month for shrinkage over the six month period was made. This was the modal estimate of storage losses by growers who completed the questionnaire a literature review supported the opinion that the loss was typical. An allowan of 5/12 of 1 per cent per month interest was made on the capital invested in the potatoes. Over the marketing season zero net returns from storage were indicate However, the loss was greatest at the beginning of the storage period and the ga greatest at the end.

Chart 10 suggests that there are possiblities for storage gains by extending the marketing period. Grower prices generally increase faster than storage costs beyond the October-April period. (See Chart 14). Efficient storag requires weight and quality losses to be minimized which can be accomplished with the use of refrigeration and sprout inhibitors. For gains to be made, the increas in price received must more than offset the increased loss in weight and quality and other storage costs incurred in extending the marketing season.

Grading Costs

Potatoes are graded by two methods, by hand, and with the aid of mechanical graders. Under hand grading the tubers are sorted by individual selec for size and quality whereas under machine grading the tubers are automatically si with only the culls being removed by hand. A sample of 27 growers in 1959 indica that under hand grading there was an output on the average of 6.7 hundredweights man hour as compared to 10.9 when machines were used. Cost of grading per hundre weight using the hand method averaged $0.146 compared to $0.123 when machines were used. It was obvious from the records that the use of mechanical graders did not invariably result in lower costs per unit. For costs to be lower, the saving due

CHART 10: COSTS AND RETURNS FOR STORAGE OF POTATOES, MANITOBA, OCTOBER, 1958 - APRIL, 1959*



* Source: Table 24

to the reduced labour requirements of machine use had to more than offset the cos of machine ownership.

Sack Charges

Expenditures for bags per hundredweight delivered were found to be fair uniform. Bag manufacturing companies were contacted and similar prices were quot for the respective sizes, large bags costing proportionately less per unit volume than small ones. As a result, differences in bag costs between growers reflect the proportions of the various sizes used. Cost of bags per hundredweight of potatoes delivered by growers responding varied from slightly over $0.12 to slight over $0.18 with an average cost of approximately $0.17.

Freight and Handling Costs

Freight and handling costs are composed of the cost of loading potatoes on the conveyance and also the cost of transporting them to market. These costs were determined on the basis of the actual costs incurred where this information was available, otherwise the average for the group was used. In the calculation of the cost of movement by the grower's truck, allowance was made for depreciation insurance, licence, maintenance, interest on investment and also labour. Cost of movement by buyer's truck was assumed to be similar to that for farm trucks in proportion to the distance travelled. Cost of shipment by P.S.V. truck was determined by referring to existing tariff schedules. The cost of rail movement included the cost of trucking to the car in certain instances, loading the car, and also the freight charges to Winnipeg. This method of calculation involves a measure of error since potatoes were not shipped by rail to Winnipeg but to other provinces. As a result, the actual cost of rail shipment is biased upward. This is substantiated by the lack of a proportional discount for potatoes f. o. b. the shipping point relative to the cost of rail movement to the city.

Freight and handling costs per hundredweight when calculated by the above procedures were $0.122 on the average when the grower used his own truck, $0.144 when the buyers truck was used, $0.218 by P.S.V. truck and $0.701 by rail. To a degree these respective figures reflect the distance shipped since P.S.V. and rail methods were used only by growers a considerable distance from Winnipeg.

Freight and handling costs of growers when using their own trucks increased less than proportionately with distance. Cost per hundredweight averaged $0.129 for growers less than 60 miles from the city and $0.195 for those at a greater distance with an average cost for all growers of $0.144. The cost per hundredweight per mile hauled was $0.0044 on the average for those less than 60 miles from the city as compared to $0.0024 for those at greater distance.

Total Primary Marketing Costs

Actual marketing costs were determined for 28 of the growers who completed the 1959 questionnaire. Growers were classified on the basis of volume of potatoes delivered, with those delivering 0 - 699 hundredweight classed as small, 700 - 1,999 classed as medium and 2,000 and over classed as large. Growers were also classified according to acreage of potatoes grown. The medium size group had

Table 25: Marketing Costs by Size of Delivery, 28 Manitoba Growers, 1958 to 1959*

Size of Delivery	Average Delivery (Hundredweight)	Number of Growers	Marketing Costs (Dollars per hundredweight)				
			Grading	Freight & Handling	Sacks	Storage	Total
Small	444	5	.207	.151	.173	.078	.609
Medium	1,316	12	.162	.186	.160	.073	.581
Large	5,687	13	.116	.249	.164	.071	.601
All Sizes	3,034	28	.126	.236	.164	.072	.598

* Sources: 1959 questionnaire and records of delivery.

the lowest total marketing cost as indicated in Table 25. There was a tendency f grading and storage costs to decline with increasing quantity delivered. Freight and handling costs increased with volume, a reflection that growers delivering large volumes were generally further from the city than those in the other groups Sack costs were similar for all groups. Grading, freight and handling, sack and storage costs for all growers on the average were 21.1, 39.5, 27.4 and 12.0 per cent, respectively, of total primary marketing costs.

Table 26: Marketing Costs by Acreage of Potatoes, 28 Manitoba Growers, 1958 and 1959*

(Dollars per hundredweight)

Acreage Class	Number of Growers	Grading	Freight and Handling	Sacks	Storage	Total Marketing Cost
0 - 19	4	.217	.180	.173	.071	.641
20 - 39	9	.157	.163	.161	.069	.550
40 - 59	8	.117	.126	.167	.081	.492
60 - 79	2	.160	.111	.171	.079	.521
80 and over	5	.114	.340	.163	.068	.685
All Classes	28	.126	.236	.164	.072	.598

* Sources: 1959 questionnaire and records of delivery.

Grading costs in relation to acreage of potatoes showed a high degree of variabili as indicated in Table 26. There was a tendency for the cost to decline with incre ing acreage, though the trend was interrupted by one high cost operator in the 60 79 acre class. Freight and handling costs declined with increasing acreage until largest acreage class was reached when there was a decided increase, reflecting in general distance of these growers from the market. Sack and storage costs exhibit little relationship to acreage. The total primary marketing costs declined with increasing acreage until the 40 - 59 acre class was reached after which these cost increased with increasing acreage.

When the respective marketing costs of the individual growers were calculated the most noticable feature was the variability indicated. Cost of growers operating under similar circumstances varied widely. Due to the high labour requirements of the various operations, labour managment became a decisive factor in determing costs. It was apparent that many growers failed to give sufficient attention to the business aspects of their operations with the result that a lack of proper management was indicated. Many growers could do much to increase their individual net returns by keeping adequate records and using them to increase the efficiency of their operations.

CHAPTER V

DISTRIBUTION

Scope

The distribution system for potatoes is very complex. There are both inter-market and intra-market movements. For the Winnipeg market there are many sources of supply and many outlets. The supply on the market is composed of domestic and United States imports as well as potatoes of local origin. Shipments to other provinces and to other centres within the province provide outlets in addition to those in Winnipeg and the immediate vicinity. There is interaction between these various markets, the movements between them reflecting the prevailing supply and price situation, the inter-market transportation costs and, for imports, the duty applied. To measure the significance of these movements in detail would involve the setting up of market models. This would involve a sophisticated analysis which could not be justified on the basis of the statistics currently available. However, an attempt will be made to evaluate the importance of these movements and their economic implications in the Winnipeg market area.

Origin of Potatoes on the Winnipeg Market

A large proportion of the potatoes sold in Winnipeg originate in Manitoba. However, imports into the area are important. It is a commonly held opinion that imports of potatoes depress the local market prices. This may be true during periods of short supply. The price at which potatoes from other sources may be laid down in Winnipeg does determine the maximum price the local grower may receive.

It is because of this that local growers have been strong supporters of the move to place a duty on imports of potatoes from the United States. This move was successful in 1957 when an import duty of 37½ cents per hundred pounds was levied on potato imports from that country. The net effect of the tariff is to raise the price on the Winnipeg market during periods of local scarcity.

The erratic pattern of local potato deliveries has been a problem in e past. Potatoes were either sold on the market in the fall or else largely ld in pits until milder weather occurred in the spring, resulting in a market y ngestion in both the fall and spring periods. This phenomenon was due to a neral lack of sufficient storage at the grower level, complicated by the scarcity nts grower storage which could be opened during the winter months. This situation being overcome by the increase in improved grower storage and also by a alization on the part of the growers that the market needs uniformity in supply. lin e delivery pattern recorded in the 1958-59 season (see Table 22) indicates that rts e grower to market movement of potatoes has been of a fairly uniform volume.

In the 1948-57 period potatoes were brought into Winnipeg from seven ovinces as indicated in Table 27. A quantity of early potatoes is usually brought from British Columbia each year, averaging slightly over seven carloads annually r the period. Other provinces in order of importance are Alberta, New Brunswick, tario and Prince Edward Island. Alberta, however, was the only province supplying tatoes in all years of the period. Average annual domestic, non-local, receipts re 112 carloads.

Imports from the United States are a very important source of supply for e Winnipeg market. Of late years approximately 150 carloads have been imported nually from states classified as "early" in the production of potatoes. These ates are the source of supply for the "new" potatoes in the winter and early ring months on the Winnipeg market. A similar quantity on the average is imported nually from states classified as "late" with North Dakota supplying 1,249 carloads 89 per cent over the ten year period. Other "late" states supplying potatoes re Minnesota, Idaho, and Montana.

Table 27: Origin of Non-Local Potatoes on the Winnipeg Market, 1948-1957*

(Carloads)

Origin	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Prince Edward Island	12	92	-	-	1	3	1	33	-	30
New Brunswick	89	60	-	1	2	17	2	75	-	47
Quebec	16	3	-	-	-	-	-	-	-	-
Ontario	12	67	54	37	-	4	4	19	8	11
Saskatchewan	5	-	-	29	7	-	-	3	-	-
Alberta	35	18	51	1	81	6	6	25	5	74
British Columbia (early)	16	9	9	4	7	9	13	-	1	6
Total Domestic	185	249	114	72	98	39	26	155	14	168
U.S.A. (early states)	52	94	115	114	115	139	146	157	148	154
Idaho	-	-	-	-	-	6	3	9	1	17
Montana	-	-	-	-	-	2	-	-	-	-
Minnesota	-	34	1	16	23	-	11	29	-	3
North Dakota	-	74	6	66	62	30	185	548	77	201
U.S.A. (late states)	-	108	7	82	85	38	199	586	78	221
U.S.A. Total	52	202	122	196	200	177	345	743	226	375
Non Local - early	68	103	124	118	122	148	159	157	139	160
- late	169	348	112	150	176	68	212	741	91	383
- total	237	451	236	268	298	216	371	898	240	543

* Source: Crop and Seasonal Price Summaries - Fruits and Vegetables Part II, Marketing Service, Canada Department of Agriculture, appropriate years.

Imports of potatoes from the "late" states fluctuate widely from year ear. To determine what relationship, if any, existed between imports and the of the crop in the respective areas these factors were subjected to a simple elation analysis. The correlation between the size of the Manitoba crop and rts of "late" crop potatoes for the 1949-57 period was -.245. This indicated ndency for imports to be greater in seasons of small local supply. However, r factors had a much greater influence in the aggregate on the determination he volume of imports. There is a considerably closer relationship between size of the North Dakota crop and imports, r= -.449. Similarly the correlation een the size of the United States "late" crop and imports was -.463. These er two correlations indicate that in seasons of large crops in the "late" es imports of potatoes from these states are less than in seasons of relatively l crops. This relationship is directly opposed to that which would reasonably expected. The expectation would be that large crops in the "late" states would low prices in those areas and hence greater exports to the Winnipeg market. offsetting factor is the tendency for large local crops and large crops in e states to occur simultaneously.

It must not be considered that the import duty is the only deterrent to -local potato supplies on the Winnipeg market. For both domestic and United tes sources of supply a high freight rate must be overcome. The freight rate ucture is not without discrimination as will be observed from the rate list in le 28. Distance is not the only determinant of cost.

sonality of Imports

Cycles in imports of potatoes are offsetting to the cycles of domestic ply on the Winnipeg market. Domestic supplies are normally greatest in the early ing and also in the fall. This cycle of domestic receipts is due in large

Table 28: Freight Rates on Potatoes, Selected Points to and from Winnipeg, by Carload Lots*

To Winnipeg from	Distance (Miles)	Rate	Rate per 1,000 Miles (Dollars per hundredweight)	Minimum Carload (Pounds)
Everglades, Florida	2,350	2.35	1.00	40,000
Bakersfield, California	2,208	1.92	.87	36,000[a]
Dayton, Idaho	1,398	1.89	1.35	40,000
Grand Forks, North Dakota	162	.153	3.27	40,000
Charlottetown, Prince Edward Island	1,904	1.76	.92	40,000
St. John, New Brunswick	1,799	1.71	.95	40,000
Vancouver, British Columbia	1,464	2.06	1.41	40,000
Ashcroft, British Columbia	1,261	1.76	1.40	40,000
Kamloops, British Columbia	1,214	1.66	1.37	40,000
Toronto, Ontario	1,208	1.60	1.33	40,000
Calgary, Alberta	823	1.46	1.77	30,000[b]
Edmonton, Alberta	793	1.43	1.80	30,000[b]
From Winnipeg to				
Saskatoon, Saskatchewan	470	.97	2.33	30,000[b]
Moose Jaw, Saskatchewan	419	.90	2.15	30,000[b]
Fort William, Ontario	398	.66	1.66	40,000
Regina, Saskatchewan	356	.83	2.33	30,000[b]

* Source: Canadian National Railways, General Freight Office, Winnipeg, Feb. 12, 1959.

[a] "except May 1 - Sept. 30 when 30,000 lbs."

[b] The 30,000 lb. rates are class rates which are the highest which the Board of Transport Commissioners will allow. Potatoes do not normally flow in volume between these points and Winnipeg. However, if a volume movement developed these rates would be subject to negotiation and the lower 40,000 lb. minimum rates would apply. In addition, rates may be further negotiated under certain conditions.

ure to the weather pattern. In the period from January 1, 1955 to date, this e has been regular though varying in intensity.

On examining imports of potatoes over time it is observed that there are rts at practically all times except when "new" local potatoes are available. consumers desire "new" potatoes at all seasons of the year; othersdesire rted potatoes for their own sake. Imports of potatoes are greatest toward the of the local storage season in late June. Lesser import peaks occur during the mber to February period.

From the seasonal pattern of imports it appears that local growers can do to increase their share of the market. With further improvements in storage shipping facilities the mid-winter peak of imports could be eliminated. There indications that the intensity of these mid-winter import peaks is declining time with the increasing awareness of growers that they must supply the market formly.

hod of Delivery to the Winnipeg Market

An interesting development locally has been the elimination of rail ship- as a method of intra-provincial movement to market. Thirty-two carloads of itoba potatoes were shipped to Winnipeg by rail in the 1948-49 season. The pments declined in subsequent years until only one carload was shipped during 1954-55 season and since that time there have been no Winnipeg receipts by rail m Manitoba points. This is an illustration of the impact of the motor truck on nsportation methods. Indeed, it might also be considered an improvement in ement efficiency on relatively short hauls.

The majority of all receipts on the Winnipeg market arrive by truck. ivals by truck during the 1955-56 crop year accounted for 81.6 per cent of the

domestic receipts and 67.9 per cent of the receipts from the United States a
accounted for 74.9 per cent of all receipts. Corresponding proportions for
1956-57 and 1957-58 crop years were 98.6, 61.1, 89.9 per cent; and 83.7, 53.
75.8 per cent respectively. In a measure, the proportion of local deliveries
reflected here since all these deliveries were by truck during the three cro
The proportion of total imports coming from North Dakota has a similar influ
since, during the three year period, 79.7 per cent of all receipts from that
arrived by truck. As a matter of interest the majority of truck receipts fro
North Dakota are by means of trucks owned by Winnipeg wholesalers or their
subsidiaries.

Movements of Potatoes to Other Areas

There are no readily available statistics of shipments from Manito
export. These figures are included in the exports from the Prairies. The U
States is normally the only destination of exports from the region. Exports
the United States over the 1948-58 period are shown on Table 29. The only sh
for export not destined for the United States over the period was one of 1,35
hundredweight sent to Hawaii in the crop year 1948-49. By far the larger pro
68.15 per cent, of the exports over the period have been certified seed.

Total domestic movement of Manitoba potatoes is not recorded. The
ment to specific markets is indicated in Table 30. Considerable quantities o
potatoes also move to other points in Eastern Saskatchewan, the Lakehead, and
various mining and pulpwood camps in Northwestern Ontario. Approximately 33
loads per year over the 1948-58 period were shipped to recorded markets. Reg
was the major receiving market accounting for 50.9 per cent of the Manitoba
shipments. Saskatoon, Edmonton and Vancouver followed in that order of impor

Table 29: Exports of Potatoes to the United States from the Prairie Provinces, 1948 - 1958*

(Hundredweight)

Year	Table Stock	Certified Seed	Total Exports
1948-49	-	5,324	6,674[a]
1949-50	-	1,181	1,181
1950-51	1,950	1,651	3,601
1951-52	4,051	4,135	8,186
1952-53	3,960	6,062	10,022
1953-54	5,650	1,805	7,455
1954-55	-	912	912
1955-56	-	781	781
1956-57	310	1,801	2,111
1957-58	-	13,302	13,302

* Source: Crop and Seasonal Price Summaries, Fruits and Vegetables Part II, Marketing Service, Canada Department of Agriculture, appropriate years.

[a] Includes 1,350 hundredweight shipped to Hawaii.

Total domestic movement of Manitoba potatoes is not recorded. The mov
ropt to specific markets is indicated in Table 30. Considerable quantities of
atoes also move to other points in Eastern Saskatchewan, the Lakehead, and in
e rious mining and pulpwood camps in Northwestern Ontario. Approximately 33 car
oads per year over the 1948-58 period were shipped to recorded markets. Regina
nds the major receiving market accounting for 50.9 per cent of the Manitoba shipr
3 Saskatoon, Edmonton and Vancouver followed in that order of importance as other r
eg ceiving centres. It is interesting to note that Manitoba potatoes have been sc
Eastern Canada though under unusual circumstances.

By comparing non-local supplies of late potatoes received on the Winnip
rket with the volume of potatoes shipped to other areas it becomes apparent tha
e city has been situated in a deficit production area. This suggests that the

Table 30: Domestic Movement of Manitoba Potatoes 1948-1958*

(Carloads)

Year	Montreal	Ottawa	Toronto	Regina	Saskatoon	Edmonton	Calgary	Vancouver	Total
1948-49	-	-	1	14	14	1	-	-	30
1949-50	-	-	-	19	2	26	-	-	47
1950-51	-	-	-	13	2	-	-	-	15
1951-52	1	2	1	21	1	2	5	2	35
1952-53	-	2	7	-	-	1	-	-	10
1953-54	-	-	-	40	26	-	-	-	66
1954-55	-	-	1	6	6	1	-	-	14
1955-56	-	-	-	8	9	-	-	13	30
1956-57	-	-	-	8	19	-	1	-	28
1957-58	-	-	-	37	14	-	-	-	51
All Years	1	4	10	166	93	31	6	15	326

* Source: Crop and Seasonal Price Summaries, Fruits and Vegetables Part II, Marketing Service, Canada Department of Agriculture, appropriate years.

per price limit of the locally produced product is determined by the price livered to Winnipeg of potatoes from other areas. The major non-local supply ea has the greatest impact and in this case it is North Dakota. This accounts r the enthusiastic support by local growers for the duty on potato imports from e United States.

ter-City Movement

The movement of potatoes between markets on the prairies follows no stable ttern. The average price for No. 1 potatoes on the respective markets is fluenced by the local production in the adjacent areas. Since shipping costs are gh relative to potato prices, the price differentials between markets vary widely. e differentials are sometimes greater than the cost of inter-market shipment in- icating the possibilities for arbitrage activities. Average annual prices for estern Canadian markets are shown in Table 31.

er Capita Consumption of Potatoes

The annual apparent domestic disappearance per capita is recorded in Table 2. These annual domestic disapperance figures are determined by the use of the ollowing procedure. The potato crop estimate is used as the initial supply base. he disappearance estimates cover all farm potato production, and includes all the otatoes grown for commercial sales, farm home consumption, livestock feed and ndustrial utilization. A shrinkage and culling allowance of 20 per cent and an llowance of 7 per cent for other waste are deducted from the crop production stimate. Imports are added (6.5 per cent being deducted for waste) and exports of oth seed and table stock are deducted. Estimates are made of the seed used within anada the following spring which, together with purchases by processors, are educted from the total supply. The residual is the amount which is assumed to

Table 31: Seasonal Wholesale Prices of Potatoes, Selected Western Markets, 1950 - 1958*

(Canada No. 1; Manitoba where quoted, otherwise local, dollars per hundredweight.)

Year	Winnipeg	Regina	Saskatoon	Edmonton	Calgary
1950-51	1.57	2.05	3.53	1.77	a/
1951-52	4.39	4.41	2.82	3.72	a/
1952-53	3.33	3.67	3.58	2.95	a/
1953-54	1.93	2.59	2.87	2.59	a/
1954-55	2.57	4.11	3.65	3.65	3.25
1955-56	2.74	4.39	3.12	3.00	2.03
1956-57	1.68	2.61	2.99	2.41	2.21
1957-58	3.53	4.70	5.31	3.31	2.93

* Source: Crop and Seasonal Price Summaries, Fruits and Vegetables Part II, Marketing Service, Canada Department of Agriculture, appropriate years.

a/ No quotation available other than for Netted Gem.

Table 32: Apparent Domestic Consumption of Potatoes per Capita, Canada, 1935-58*

Year	Disappearance per Capita (Pounds)	Year	Disappearance per Capita (Pounds)
1935	198.6	1947	151.7
1936	197.5	1948	168.4
1937	211.7	1949	152.7
1938	173.2	1950	180.8
1939	166.1	1951	122.1
1940	213.0	1952	147.9
1941	173.7	1953	159.2
1942	189.1	1954	127.1
1943	190.6	1955	150.6
1944	166.6	1956	153.3
1945	162.9	1957	161.1
1946	152.6	1958	135.4

*Source: Dominion Bureau of Statistics, Handbook of Agricultural Statistics Part IV, Food Consumption in Canada, Reference Paper No. 25, and subsequent statements.

be used for human food.[8/] It must also be noted that producer surveys are largely used for the determination of these figures.

It is apparent that the trend is for the per capita consumption of potatoes in Canada to decline over time. A decline in per capita consumption from 198.6 pounds in 1935 to 135.4 pounds in 1958 is indicated, a decline of 31.8 per cent over the period. The statistics suggest a high degree of variation in annual per capita consumption. An unknown but substantial part of this variation may arise from errors in the estimates of consumption.

8/ Dominion Bureau of Statistics, Handbook of Agricultural Statistics Part IV, Food Consumption in Canada, Reference Paper No. 25, and subsequent statements.

CHAPTER VI

PRICES AND MARGINS

Prices and Price Movements

Wholesale prices and receipts are recorded for selected Canadian markets by the Marketing Service of the Canada Department of Agriculture. There has been considerable criticism of these statistics from the standpoint of accuracy by growers and certain sections of the trade. The method that is used to collect the information appears to be sound so any inaccuracies existing must be largely attributed to the reporting organizations.

In order to collect the information a representative of the local office visits the wholesales on Friday, and records the wholesale prices and the receipts which are supposed to be based on the actual invoices. If these figures as given are accurate, the statistics presented by the Service should not be open to question. In any event, they are the most accurate figures currently available.

Prices paid to growers have been recorded in recent years by the Extension Service of the Manitoba Department of Agriculture. These quotations are obtained daily from selected wholesales that do a substantial business with growers. The C.B.C. Farm Broadcast uses these prices on its market quotation service. For use in this analysis these quotations were converted to a weekly basis to obtain an estimate of the grower-wholesale margin for the recorded period.

An effort was made to obtain representative retail prices for potatoes for comparative purposes for the period that grower prices were recorded. However, it was found that potato retail prices were not currently recorded on this basis. While the Dominion Bureau of Statistics records such prices by months, these prices are converted to price relatives before publication in determining the influence of the price of potatoes on the consumer index. These statistics were therefore considered unsuitable in the analysis.

The farm retail price margin has been calculated for Canada for a series of years by Hillhouse and Schrader.[9] For potatoes an interesting methodology was followed. The farm and retail price series were brought to a common denominator by adjusting them to prices per unit of an equivalent product. An 8 per cent shrink was assumed to exist between the producer and the consumer. This figure was obtained in studies in the United States and applied to the Canadian data. Farm prices were adjusted to show the value of the farm equivalent weight of the unit sold at retail. The price spread between the farmer and the consumer was obtained by subtracting the net farm value from the adjusted (adjusted for grade, subsidy, etc.) retail price. The farm share of the consumers dollar is the net farm value expressed as a percentage of the adjusted retail price.

A similar series for the 1950-56 period has also been published. However, the basic unit for the calculation of the margin has changed from 15 to 10 pounds. To make this series comparable with that of the former period, this base was multiplied by 1.5. It is recognized that the use of such a conversion unit is open to criticism as some of the marketing costs do not increase proportionately with the size of the unit. Since the trends indicated in the former period are continued in the adjusted series of the latter period without any apparent inconsistency, its use may be justified. The margins are recorded in Table 33. The farm share of the retail price has decreased substantially over time, declining from 50.8 per cent in 1935 to 41 per cent in 1956 with many variations within the period. In absolute terms (deflated dollars) the farm price has exhibited tremend-

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9/ Hillhouse, F. W., and Schrader, F. M., Marketing Margins for Selected Canadian Agricultural Products 1935-49, Econ. Div., Canada Dept. of Agr., 1950, p. 18.

Table 33: Annual Farm-Retail Margin for 15 pounds of Potatoes, Canada, 1935-56*

Year	Retail Price ¢	Farm Value ¢	Marketing Margin ¢	Deflated Retail Price ¢	Deflated Farm Price ¢	Deflated Mktg. Margin ¢	Farm Share (Per cent)	Margin Share (Per cent)
1935	19.3	9.8	9.5	20.4	10.3	10.1	50.8	49.2
1936	30.9	19.4	11.5	32.0	20.1	11.9	62.8	37.2
1937	28.7	15.3	13.4	26.6	14.2	12.4	53.3	46.7
1938	21.3	12.2	9.1	20.9	12.0	8.9	57.3	42.7
1939	28.8	18.0	10.8	29.0	18.1	10.9	62.5	37.5
1940	30.7	17.2	13.5	28.4	15.9	12.5	56.0	44.0
1941	28.1	15.5	12.6	24.1	13.3	10.8	55.2	44.8
1942	42.6	24.5	18.1	34.6	19.9	14.7	57.5	42.5
1943	47.6	30.4	17.2	37.2	23.7	13.5	63.9	36.1
1944	45.8	26.4	19.4	35.1	20.2	14.9	57.6	42.4
1945	51.9	31.9	20.0	39.3	24.2	15.1	61.5	38.5
1946	51.8	32.3	19.5	37.4	24.4	14.0	62.4	37.6
1947	51.5	28.8	22.7	31.5	17.6	13.9	55.9	44.1
1948	60.7	33.0	27.7	31.4	17.1	14.3	54.4	45.6
1949	52.6	26.0	26.6	26.5	13.1	13.4	49.4	50.6
1950	49.5	22.3	27.2	23.4	10.5	12.9	45	55
1951	53.1	26.0	27.1	22.1	10.8	11.3	49	51
1952	94.6	57.7	36.9	41.9	25.6	16.3	61	39
1953	58.8	25.3	33.5	26.6	11.4	15.2	43	57
1954	56.0	25.2	30.8	25.8	11.6	14.2	45	55
1955	69.5	28.5	41.0	31.7	13.0	18.7	41	59
1956	74.7	30.6	44.1	33.1	13.6	19.5	41	59

*Source: Hillhouse, F. W. and Schrader F. M., Marketing Margins for Selected Canadian Agricultural Products 1935-49 Econ. Div., Canada Dept. of Agr., 1950, and the Economic Annalist. June 1957, p. 71.

ous variability. The average farm price for 15 pounds of potatoes during the 1935-56 period was 16.4 cents. The range of prices was 13.9 cents, the low point being 10.3 cents in 1935 and the high point being 24.2 cents in 1945. The deflated farm price shows neither a rising nor falling trend over the period.

On the other hand, the marketing margin has increased from 49.2 per cent of the retail price in 1935 to 59 per cent in 1956. The marketing margin has been proportionately less in times of high retail prices as compared to low. This is to be expected, since margins tend to be much more stable than retail prices. In absolute terms (deflated dollars) the marketing margin increased from 10.1 cents for 15 pounds of potatoes in 1935 to 19.5 cents in 1956 with an average margin over the period of 13.6 cents. This increase in the margin is to be expected since transportation, grading, packaging, and the other merchandising costs have increased substantially over the period. In addition to this, the consumer is demanding increased services which add to costs. These increased services entail such activities as washing and sizing, and packing in fancy retail containers.

In order for the farmer to regain his former share of the retail price either one or both of the following conditions must be met; a decline in the margin due to improvements in merchandising that lead to a decrease in cost and/or an increase in the farm price. In an American study [10] it was established that an increase in the productivity of the marketing force had occurred in recent years. In other words, the present margin is less than would have prevailed otherwise.

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[10] Simmons, W. M., The Vegetable Situation, Agr. Mktg. Serv., U.S.D.A., Oct. 1958, p. 29.

In addition, it has been demonstrated in another study reported in the same publication that the consumer demand for services is much more responsive to changes in income than is the demand for food. With the rising incomes of the 1935-56 period, no doubt consumers were willing to pay for increased services. In a declining income period antagonism toward paying for the increased services will be evident and here the impact would be felt at both the farm and the marketing service levels. Where services are increasing in cost, the increase will be absorbed at both the farm and the consumer level and the division of the increase will be determined by the relative elasticities of demand and supply at these two levels of the market. A quotation from the same report[11/] is relevant to this discussion.

"In some instances, increased services probably have benefitted farmers by stimulating demand for farm products. Only through increased emphasis on processing together with increased attention to quality and attractive packaging of the fresh item, has the potato industry been able to hold its own during the past few years. But of course the costs of marketing services continue to rise and, in general, respond little to downward adjustments in economic activity. Thus, the farmer is the first to feel the impact of any reduction in consumer spending on food and associated services. This is largely because of the semi-fixed nature of marketing costs, particularly over short periods of time."

In view of these facts it is doubtful if the farm share of the retail price will exhibit an upward trend in the foreseeable future. Rather, an effort must be made to maintain consumer demand in order for the farm share to stay even at its present level. The success of such an effort will be determined in a large measure by the level of consumer incomes.

11/ Simmons, W. M., op cit., p. 30.

Farm Price Movement

The movements of the deflated farm price for potatoes for Canada and Manitoba during the 1935-57 period are illustrated in Chart 11. The price movement in Manitoba follows somewhat that of Canada as a whole but it is evident that some local factors predominate in influencing the movement.

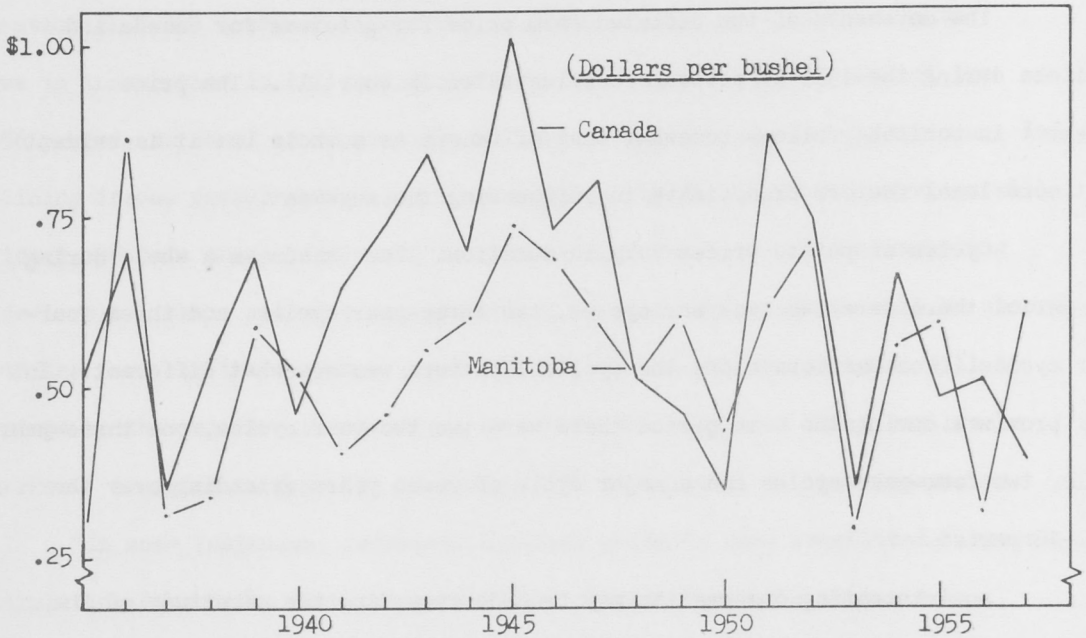
Cycles of potato prices vary in duration. For Canada as a whole during the period there were two two-year cycles, two three-year cycles, and three four-year cycles. For Manitoba alone the cyclical pattern was somewhat different. In this province during the same period there were two two-year cycles, one three-year cycle, two four-year cycles and a major cycle of seven years extending over the 1941-48 period.

An interesting observation may be made regarding the magnitude of the cyclical variation. For Canada as a whole the cyclical variation is much greater than for Manitoba. This is unusual since statistical reasoning would suggest that the magnitude of the cyclical variation would be greater for a smaller region. The average deflated price during the 1953-57 period as compared to the 1935-39 period declined 14.3 per cent for Canada and 11.2 per cent for Manitoba. The potato industry in Manitoba could be said to have greater price stability than that prevailing in the whole country.

Seasonality of the Farm Price Variation

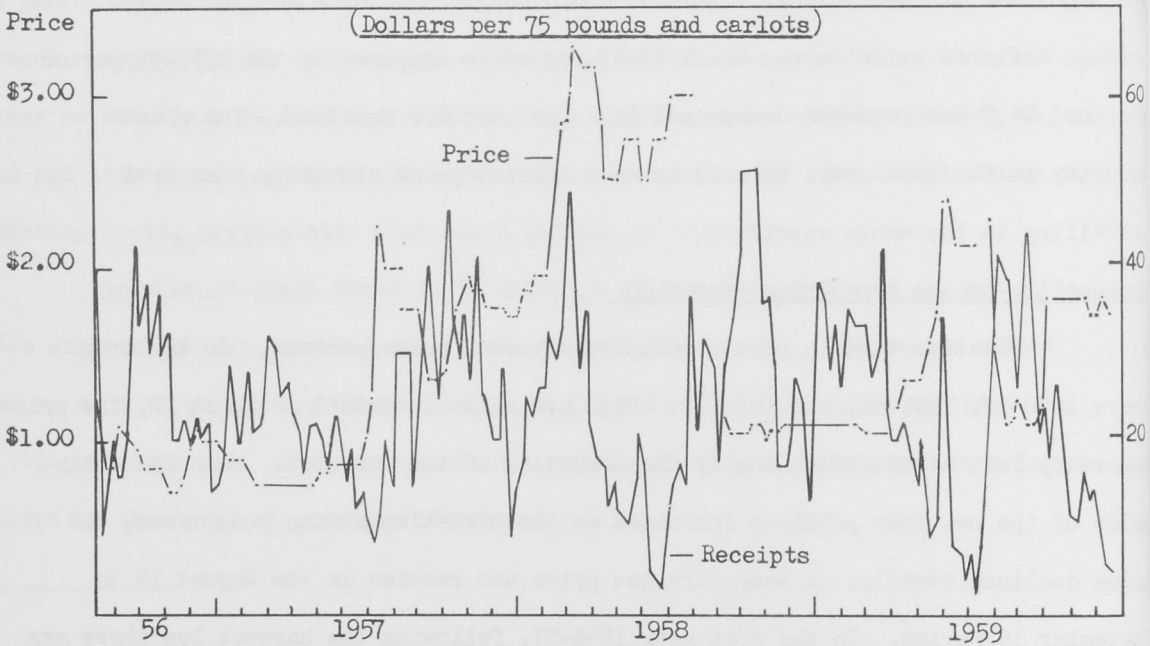
Potatoes tend to have a definite seasonal price pattern. In the crop years 1956-57, 1957-58, and 1958-59, which are shown in detail in Chart 12, the price generally fell at the beginning of the marketing of the new crop. When the deliveries of the new crop potatoes increased as the marketing season progressed, the price declined rapidly. A temporary low price was reached in the August 15 to September 15 period. In the crop year 1956-57, following the harvest low there was

CHART 11: DEFLATED FARM PRICES FOR POTATOES, CANADA AND MANITOBA 1935-57*



* Source: Quarterly Bulletin of Agricultural Statistics, Dominion Bureau of Statistics, Appropriate years.

CHART 12: GROWER PRICE AND DOMESTIC RECEIPTS OF POTATOES ON WINNIPEG MARKET, WEEKLY 1956-57 - 1958-59*



* Sources: Daily Grower Prices, Manitoba Dept. of Agriculture and Fruit, Vegetable & Honey Report, Marketing Service, Canada Dept. of Agriculture.

a temporary trend toward price recovery followed by a decline to a stable price for a considerable period. The 1957-58 marketing season indicated a different pattern. There was a general price increase as the marketing season progressed. In the 1958-59 season the price stabilized at the level experienced during harvest for most of the period. However, in all years there was a price rise in varying degree as the end of the marketing season approached. These price movements reflect somewhat the level of domestic receipts. When domestic receipts are low the tendency is for price to be high and vice versa. Many anomolies occur since the movements are not uniform.

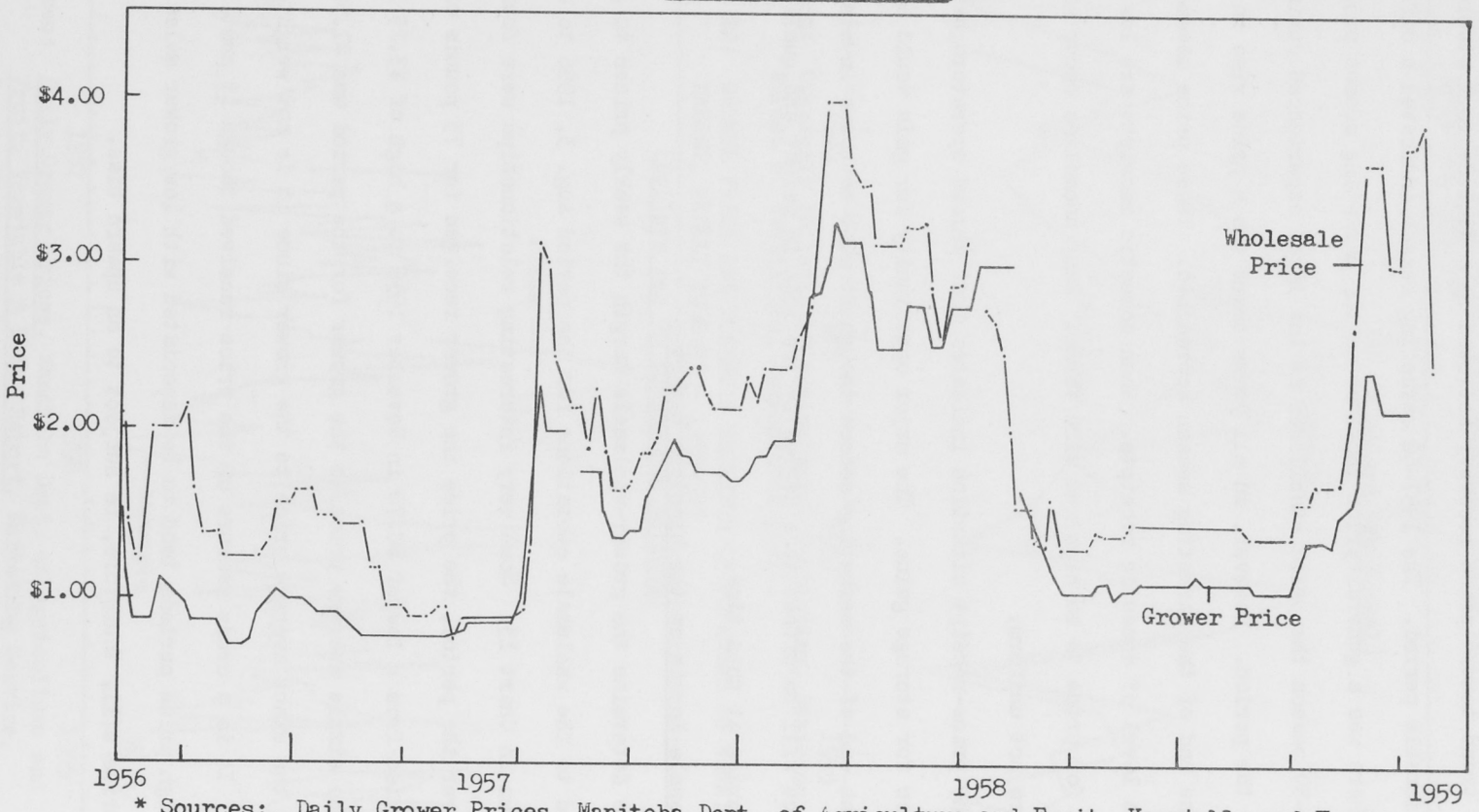
The price-receipt situation indicates that shrewd operators have opportunities for storage gains. The major opportunity for gain would appear to be toward the end of the marketing season though it must be borne in mind that the gain in price will be offset to a degree by the loss in weight and quality that may occur in storage at this time.

Grower-Wholesale Margin on the Winnipeg Market

To determine the grower-wholesale margin the weekly prices to growers were related to the wholesale quotations for the period Aug. 3, 1956 to July 31, 1959 as shown in Chart 13. Some very interesting relationships were found to exist.

Over the period, the price the grower received for 75 pounds of No. 1 potatoes varied from a low of $0.70 in November 1956 to a high of $3.25 in March of 1958. The simple average price to the grower for the period was $1.50. This will not be the exact average price to the grower since it is not weighted by deliveries. It is a crude measure of the price received though it must be borne in mind that high price periods tend to be associated with low grower sales. The indicated price will, therefore, be subject to an upward bias.

CHART 13: GROWER AND WHOLESALE PRICES FOR POTATOES, WINNIPEG, 1956-57 - 1958-59*
(Dollars per 75 pounds)



* Sources: Daily Grower Prices, Manitoba Dept. of Agriculture, and Fruit, Vegetable and Honey Report, Marketing Service, Canada Dept. of Agriculture.

Wholesale prices also exhibit a high degree of variability. The range of the wholesale price over the period is greater than that of the grower price. As the price to the grower increases, the grower-wholesale margin increases also. In other words, the wholesaler apparently endeavours to take a percentage mark-up on potatoes. The wholesale prices over the period range from $0.75 for 75 pounds of No. 1 potoatoes in May of 1957 to $4.00 in March of 1958. There were periods during which wholesalers handled potatoes at a loss. These periods occurred in May and July of 1957, in February of 1958, and also during the July-September period of the same year. In other words, during these periods other lines handled by the wholesaler were called upon to subsidize the potato operation. This lends support to the theory that wholesale sales of potatoes are often "tied", where potatoes are used as an item to attract sales of more profitable lines.

Such methods of sale are to the benefit of the potato grower. During low grower price periods the wholesale mark-up is negligible and sometimes the potatoes are handled at an actual loss in price. The net result is that growers obtain a higher price than they would otherwise receive during the low price period. On the other hand, the grower-wholesale price spread increases greatly during high price periods, and there is reason to believe that at such times the potato operation of the wholesale subsidizes other lines. However, since relatively fewer potatoes are sold by growers during high price periods it would appear that they stand to gain by these margin fluctuations at the wholesale level.

The average wholesale mark-up on a 75 pound bag of No. 1 potatoes during the three year period was $0.41. The margin varied from a gain of $1.52 per bag in July of 1959 to a loss of $0.52 in August of 1958. The average is a simple one here also and therefore may be subject to an upward bias.

While the wholesale price at times was less than the price to the grower, it does not necessarily hold that potatoes were a losing item for the wholesale.

This depends on the relative volume of potatoes purchased from the grower at the time of price disadvantage to those held in storage which may have been purchased at a relatively lower price and sold during such periods. The determining factor from the point of view of a profitable wholesale operation depends on the ability of the manager to forecast the price movements.

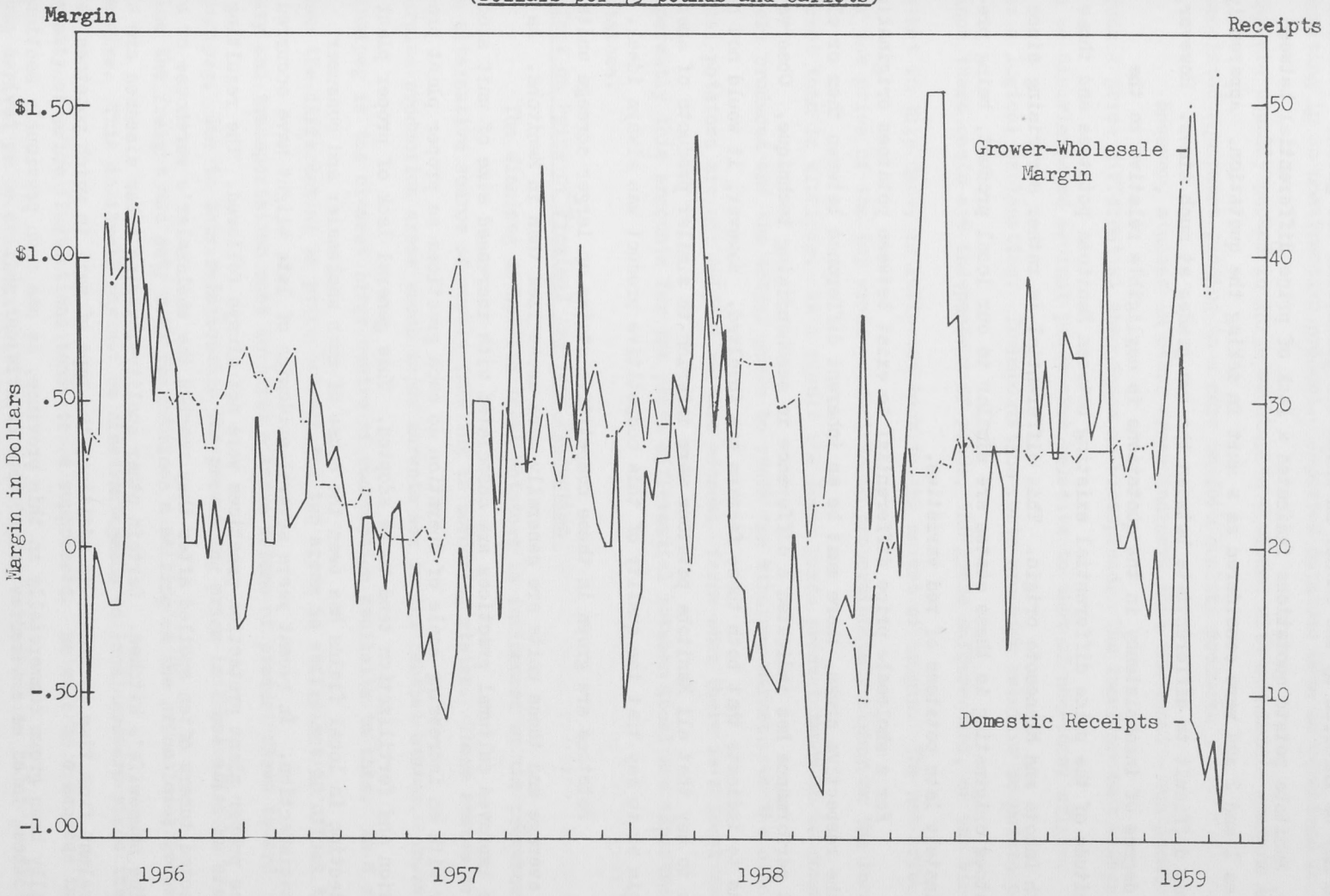
The grower-wholesale margin apparently has little relationship to the volume of domestic receipts as indicated in Chart 14. There is a distinct lack of any indication of a consistent proportional relationship existing between the margin and the level of domestic receipts. In some periods the margin increases with increasing receipts and at others it declines. A more adequate comparison could be made if the quantities of the local receipts were available.

An average mark-up of $0.41 per bag at the wholesale level cannot be considered excessive in view of the services rendered. For this $0.41 margin the wholesaler at times regrades and repacks, stores, handles and sells the potatoes. Much criticism has been levelled against the wholesaler by the grower in the past. In general, this criticism is unfounded. However, the wholesaler is in a much stronger bargaining position and is much better informed than the individual grower on the market and derives profits therefrom. The grower should be concentrating his efforts toward obtaining more adequate market information and improving his bargaining position by collective action in the market place.

Price of Manitoba Potatoes Relative to United States Imports on the Winnipeg Market

It became apparent as the data on the price of potatoes on the Winnipeg market was collected that there was a distinct difference between the quotations for local potatoes and those of North Dakota and Minnesota origin. For the purpose of comparison, quotations for these American potatoes were converted to a 75 pound basis. The mid-points of the price quotations for both those of local origin and those from the United States were taken as being representative prices. Some difference in

CHART 14: GROWER-WHOLESALE MARGIN IN RELATION TO DOMESTIC RECEIPTS, WINNIPEG, AUGUST 3, 1956-JULY 31, 1959.
(Dollars per 75 pounds and carlots)



* Sources: Daily Grower Prices, Manitoba Dept. of Agriculture, and Fruit, Vegetable and Honey Report, Marketing Service, Canada Dept. of Agriculture.

grade may be inferred by the manner in which the quotations are given. Occasionally, Manitoba potato quotations indicated a lack of price differential between grades 1 and 2 and were considered as a unit in making the quotation. Apparently it was difficult to differentiate between the two grades at such times. However, the degree of inconsistency in the quotations is negligible relative to the magnitude of the price differential existing between Manitoba potatoes and those of North Dakota and Minnesota origin. This differential is rather surprising since potatoes originating in these states are similar to our local product, being predominately late potatoes of red varieties.

For a wholesale price differential to exist between potatoes originating in the respective areas, there must be an inherent difference between them or else past performance has indicated a difference in merchandising technique. Observation tends to indicate that both these factors are involved. However, it would not be true to say that all Manitoba potatoes were inferior to similar products of American origin or to say that the quality of this competitive product was always ideal.

Potatoes are grown in these competitive states on larger acreage units on the average and these units are generally more mechanized than in Manitoba. As a rule improved cultural practices are associated with increased size of unit since only with an increasing scale of operation do such practices as proper plant protection and fertilization tend to be adopted. This general lack of proper plant protection in local fields has been the cause of much wholesaler and consumer dissatisfaction. In recent years several epidemics of late blight have occurred since proper plant protection practices were not always followed. The resulting infected tubers often spoiled after they reached the wholesaler's warehouse or even in the housewife's kitchen. Certain other quality-lowering tuber diseases are also prevalent from time to time. In addition, the type of soil in which potatoes have usually been grown commercially in this province, as has been previously mentioned, is such that it tends to adhere to the tubers under certain harvesting conditions,

resulting in an unattractive product. Imported potatoes have an advantage in that they are usually packed in large warehouses equipped with mechanical graders and associated equipment leading to a more uniform quality product.

However, studies in other areas indicate that the local - non local product price differential phenomenon is widespread. The local product always tends to be discriminated against price-wise relative to that of non-local origin. This has a logical explanation. Transportation costs are high relative to potato prices. Since these costs are independent of grade, the grade differential, on the Winnipeg market in this case, is reflected back to the market of origin. The net effect is for the price of the top grade product to be proportionately higher on the local market than in Winnipeg. As a result the lower grade product tends to be consumed where produced and the better grade to reach the Winnipeg market. On the other hand, local potatoes are not subject to this economic force when there is a local deficit. Apparently this accounts for the price differential between local and imported potatoes.

Effect on Price of Proximal American Production

The Winnipeg market for local potatoes is influenced by the presence of an alternative source of supply existing in bordering states. These states are surplus production areas whose major markets are in the central states. However, Winnipeg is the closest large centre of consumption available to them. As a result, when the differential in price between the two areas is sufficient to offset the duty and transportation cost involved a large volume of product flows toward Winnipeg. Due to this relationship the prevailing price in these American areas plus the freight and duty normally provides a ceiling on the price local growers may receive. This in itself may not be disadvantageous to local growers since the intensity of price fluctuations tends to be suppressed. As will be discussed later this derived price ceiling inhibits to some degree variations in local production.

Local growers have complained bitterly about this American competition. They contend that these imports exert an influence on local prices out of proportion to their magnitude. There have been instances where imports by wholesalers were greater than required to supplement local production in meeting the average demand with the result that price deterioration took place. This situation could be largely avoided by more adequate production statistics and more uniform marketings by local growers.

In an effort to determine how American conditions affect local grower prices over time, use was made of the multiple correlation technique and applied to the 1949-57 period. The annual average Manitoba grower price was deflated by the wholesale index and used as the dependent variable X_1. The size of the late crop in the United States X_2, the size of the Manitoba crop X_3, and the volume of imports from late crop states X_4, were used as the independent variables. The coefficient of multiple correlation $R_{1.234}$ was found to be .74, or in other words, variations in the size of the United States late crop, the size of the Manitoba crop, and imports of late crop potatoes accounted for 54 per cent of the variations in the deflated Manitoba price. An estimate of this price may be made by the use of the formula.

$$X_1 = 88.626212 + .000537X_2 - .000572X_3 + .000732X_4$$

where X_1 = deflated Manitoba price per 100 pounds

X_2 = size of the United States late crop in millions of hundredweight

X_3 = size of the Manitoba crop in thousands of hundredweight

X_4 = imports of United States late potatoes in thousands of hundredweight

However, such an estimate would involve considerable error since 46 per cent of the variations in the Manitoba price remain unexplained.

The size of the Manitoba crop is the primary determiner of the price growers receive. With the size of the United States late crop and the level of

imports held constant, the size of the Manitoba crop accounted for 47 per cent of the variations in price, $r_{13.24} = -.69$. Likewise, the size of late crop in the United States accounted for 14 per cent of the price variation, $r_{12.34} = .37$, when the level of imports and the size of the Manitoba crop were held constant. On the other hand, imports accounted for only 6 per cent of the price variation, $r_{14.23} = .24$, when the size of the Manitoba crop and that in the late states was held constant.

The size of the crop in the late states and the level of imports would be expected to vary in direct proportion since when large crops prevail the price normally would be low. However, an inverse relationship exists, $r = -.46$, as when large crops prevail in the late states less potatoes tend to be imported by the Winnipeg market. While this relationship may be surprising it may be rationalized on the basis that large crops in the late states tend to be associated with large Manitoba crops. This relationship follows from the similarity of production in those late states adjacent to Manitoba which exert the major influence on the local market.

It is apparent that while imports of American potatoes affect the price of the local product, the degree of influence tends to be overestimated by some growers. Under normal conditions this supplementary source of supply may work to the advantage of local growers because of its price stabilizing influence. On the other hand, the export of American marketing problems to the local market by dumping practices should be prevented.

CHAPTER VII

ANALYSIS OF SUPPLY AND DEMAND

Estimates of Demand

In the course of this study an effort was made to determine, within the limitations of the statistics available, the aggregate demand for potatoes in Canada. It was considered that the demand in Manitoba would follow a similar trend proportionately since statistics to derive this demand were not available. The wholesale price at Montreal was taken as indicative of the price for the nation as a whole.

The statistics on consumption when used as a basis for determination of the demand function are open to criticism. Their use is justified only by the lack of more adequate data. The domestic disappearance figures are the residuals of total production after deductions are made for exports, imports, and processing.

In order to estimated the demand in terms of constant dollars, the wholesale price at Montreal was deflated by the wholesale price index for the respective years. This procedure rendered the demand curve obtained independent of the general level of prices.

When the deflated price at Montreal was plotted on a graph in relation to the domestic disappearance, Chart 15, for the respective years of the 1937 - 56 period it became evident that a shift of demand had occurred between the earlier and later years. There also appeared to have been a change over time in the elasticity of demand.

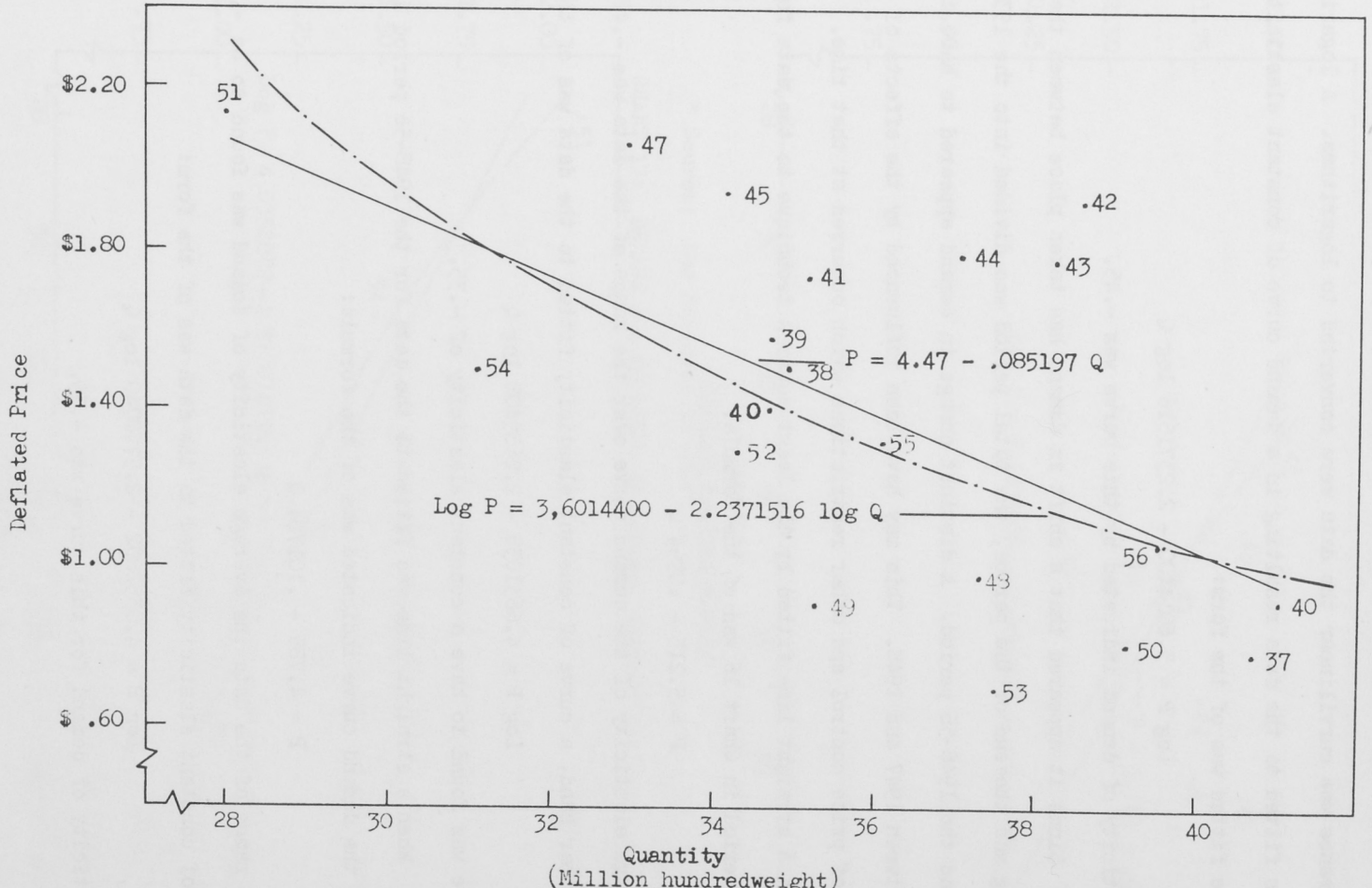
In the analysis a straight line regression between price and quantity, was calculated for the whole period. The formula for this curve was found to be:

$$P = 4.47 - .085197\ Q$$

where P = deflated wholesale price at Montreal

Q = domestic disappearance in millions of hundredweight. Over the range of the data the average elasticity was calculated to be -.31.

CHART 15: DEMAND FOR POTATOES IN CANADA, 1937-56*



* Source: Calculted from data in Production Trade and Prices for Principal Agricultural Products, Dominion Bureau of Statistics Prices are deflated by the general wholesale price index

In an effort to determine if the relationship between price and disappearance was curvilinear the data were converted to logarithms. A logarithmic curve was fitted to the data resulting in a demand curve of constant elasticity. The curve fitted was of the form:

$$\text{Log } P = 3.6014400 - 2.2371516 \log Q$$

The elasticity of demand indicated by this curve was -.45.

Since it appeared that a shift in demand had taken place between the beginning and the end of the period, the total period was divided into the 1937-47 period and the 1948-56 period. A distinct change in demand appeared to have taken place between 1947 and 1948. This may have been influenced by the effects of the removal of price control and other restrictions which occurred at that time.

A straight line fitted by the least squares technique to the data for the 1937-47 period in Chart 16 was of the formula:

$$P = 5.215 - .0994\ Q$$

The average elasticity of the demand curve over the range of the data was -.42. On the other hand, a curve of constant elasticity fitted to the data was of the form:

$$\text{Log } P = 4.6631038 - 2.8689408 \log Q$$

The curve was found to have a constant elasticity of -.35.

When a straight line was fitted to the data for the 1948-56 period in Chart 17 the demand curve indicated was of the formula:

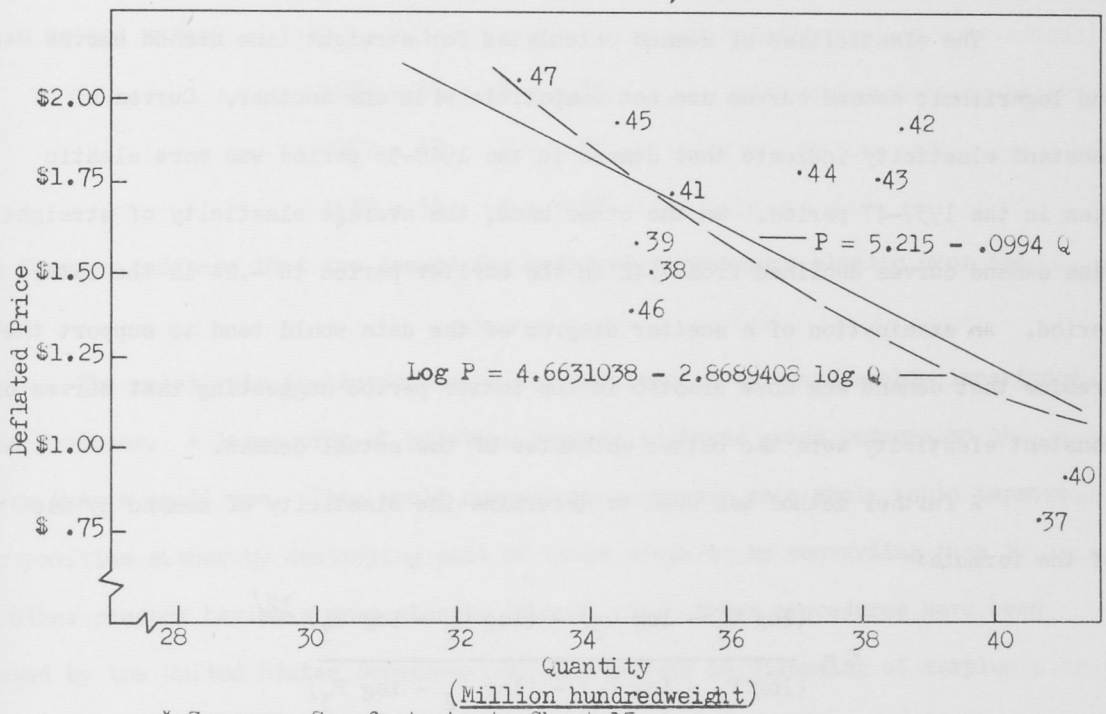
$$P = 4.785 - .101784\ Q$$

Over the range of the data the average elasticity of demand was found to be -.24. A curve of constant elasticity fitted to the data was of the form:

$$\text{Log } P = 4.0352802 - 2.5770740 \log Q$$

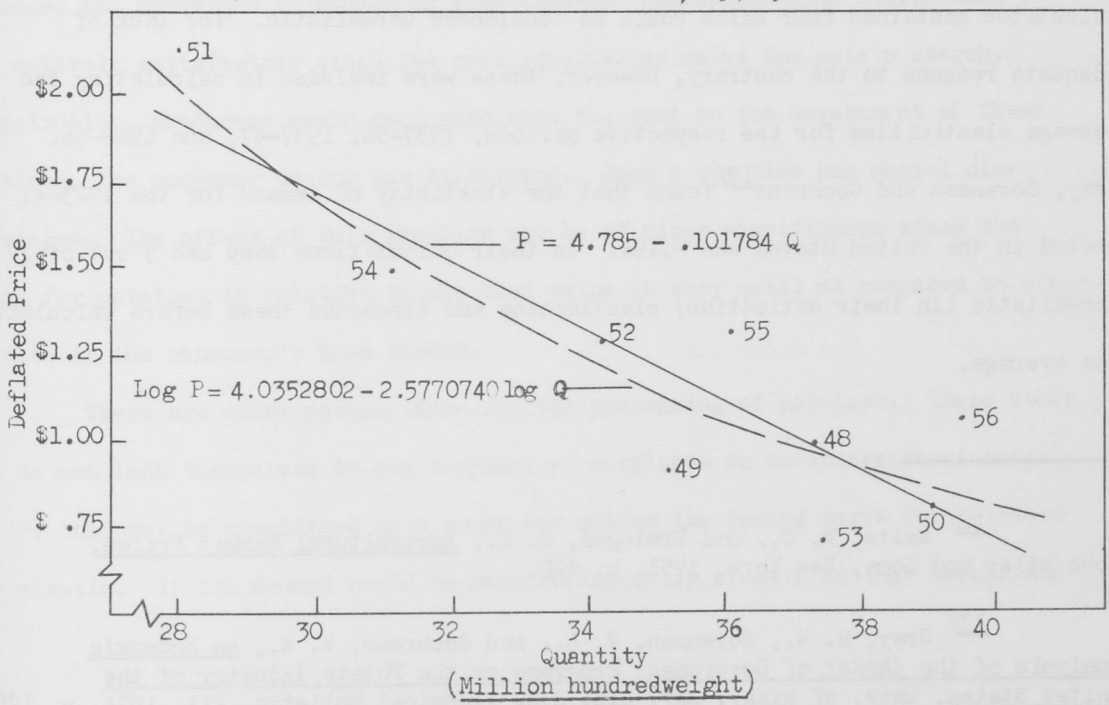
The elasticity of demand for this curve was -.39.

CHART 16: DEMAND FOR POTATOES IN CANADA, 1937-47*



* Source: See footnote to Chart 15

CHART 17: DEMAND FOR POTATOES IN CANADA, 1948-56*



* Source: See footnote to Chart 15

The Elasticity of Demand

The elasticities of demand calculated for straight line demand curves and logarithmic demand curves are not compatible with one another. Curves of constant elasticity indicate that demand in the 1948-56 period was more elastic than in the 1937-47 period. On the other hand, the average elasticity of straight line demand curves declined from -.42 in the earlier period to -.24 in the later period. An examination of a scatter diagram of the data would tend to support the premise that demand was more elastic in the latter period suggesting that curves of constant elasticity were the better estimates of the actual demand.

A further method was used to determine the elasticity of demand by use of the formula:

$$E = \frac{(\log Q_1 - \log Q_2) - (\log Q_2 - \log Q_3)}{(\log P_1 - \log P_2) - (\log P_2 - \log P_3)}$$ [12/]

for consecutive periods of three years duration. The eighteen elasticities calculated contained four which could be considered unrealistic. For lack of adequate reasons to the contrary, however, these were included in calculating the average elasticities for the respective periods, 1937-56, 1937-47, and 1948-56. Gray, Sorenson and Cochrane[13/] found that the elasticity of demand for the 1923-41 period in the United States was -.194. In their calculations they had 5 out of 17 unrealistic (in their estimation) elasticities and discarded these before calculating the average.

12/ Waite, W. C., and Trelogan, H. S., Agricultural Market Prices, John Wiley and Sons, New York, 1951, p. 428.

13/ Gray, R. W., Sorenson, V. L., and Cochrane, W. W., An Economic Analysis of the Impact of Government Programs on the Potato Industry of the United States, Univ. of Minn., Agr. Exp. Stn. Technical Bulletin, 211, 1954, p. 128.

The average demand elasticities for the respective periods calculated by this method were:

1937 - 56 E = -.35

1937 - 47 E = -.23

1948 - 56 E = -.55

These figures indicate that the demand for potatoes became more elastic over the period.

The relatively inelastic demand for potatoes is of considerable importance to the producer. A large crop of potatoes results in lower gross returns to the growers than a small one. This would suggest that growers as a whole would improve their position either by destroying part of large crops or by converting them to some other product having a more elastic demand. Both these procedures have been followed by the United States Department of Agriculture in disposing of surplus potatoes, though not without difficulties. In that country surplus potatoes were purchased and converted to starch or else dumped. Conversion into starch hasn't been entirely satisfactory since low cost substitutes exist for potato starch. Theoretically, producers would gain more than the cost to the Government of these practices, the consumer paying the difference. Such a practice has social disadvantages. The effect of this practice may be of minor significance since the outlay for potatoes in relation to the food value is very small as compared to other products in the consumer's food basket.

There are other possiblities for the processing of potatoes. These other uses do not lend themselves to the disposal of surpluses on an intermittent basis. Rather, they may be considered as a means for making the demand curve for potatoes more elastic. If the demand could be made sufficiently elastic in this manner the

large crop - small returns phenomenon would be modified. However, in the foreseeable future the elasticity of demand will probably not exceed unity.

Possiblities for Processing

The earlier study[14] suggested that an investigation be made of the possibilities for processing vegetables as a means for disposal of surpluses. Several methods of processing potatoes are now practised. These include manufacture into chips, flakes, granules, frozen french fries and starch. There are several modifications of the different types of product. In all cases the demand curve for these products is more elastic than the fresh form since a greater range of substitutes is available.

In order to determine to what extent the use of these products has increased over time, an effort was made to determine the trend in the per capita consumption of these products in Canada. Statistics on the imports of these specific products from the United States are just beginning to be recorded. However, statistics are available on Canadian factory shipments of potato chips and flakes.[15] While a large proportion of the total quantity consumed in this country is imported from the United States, the Canadian statistics should indicate the trend of consumption in this country. The shipment statistics are related to the population in Table 34. Similar statistics of factory shipments of potato starch are not available.

While the amount of increase in the per capita consumption of chips and flakes indicated by these data is small in absolute terms, the proportional increase over the period has been substantial. Consumption per capita increased by over six times from 1945 to 1957. It must also be borne in mind that these consumption figur

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[14] Elliot, et. al., op. cit., p. 95.

[15] Dominion Bureau of Statistics, Miscellaneous Food Preparations Industry, appropriate years.

Table 34: Factory Shipments of Potato Chips and Flakes, Canada, 1945 - 1957*

Year	Factory Shipments (Thousand pounds)	Value (Thousand dollars)	Population (Thousands)	Shipments per Capita (Pounds)
1945	2,446	858	12,394	.20
1946	2,156	810	12,622	.17
1947	2,123	911	12,888	.16
1948	3,592	1,644	13,167	.27
1949	6,016	2,739	13,447	.45
1950	7,026	3,280	13,712	.51
1951	8,407	4,670	14,009	.60
1952	10,596	5,637	14,459	.73
1953	12,760	7,084	14,845	.86
1954	16,909	8,910	15,287	1.11
1955	18,372	9,625	15,698	1.17
1956	20,433	12,202	16,081	1.27
1957	21,074	13,826	16,589	1.27

* Source: Dominion Bureau of Statistics, Miscellaneous Food Preparations Industry, appropriate years.

should be expanded by approximately five times, due to the dehydrating effects of the respective processes, when expressing the consumption in terms of the raw product.

In connection with the foregoing discussion, reference should be made to the situation in the United States where the consumption of processed products has increased to a greater degree than in this country. Statistics for potatoes utilized in that country in 1957 are given in Table 35. The proportion of the total crop that is processed continues to increase in the United States. In 1959 out of a total per capita consumption of approximately 106 pounds, 31 pounds or 29 per cent, were consumed in processed form.

Table 35: Potato Utilization in the United States, 1957*

Use	Quantity Utilized (Million hundredweight)	Proportion of Total Production (Per cent)
Chips and Shoestrings	17.4	7.3
Starch and Flour	12.4	5.2
Frozen French Fries	4.2	1.8
Dehydrated	3.8	1.6
Other (canned, etc.)	3.2	1.3
Total Processed	41.3	17.2
Total 1957 Production	239.5	100.0

*Source: Agricultural Marketing Service, U.S.D.A., Agricultural Situation, Vol. 43, No. 1, Jan. 1959, p. 7.

It is to be anticipated that the development of processing in this country will follow the American pattern. This development is fostered by urban living. A lag in the adoption of the American habits is to be expected because of the slower development of urbanization in this country. However, there were 29 plants engaged in potato processing in 1957 indicating that the processing industry has already assumed considerable size.

(a) Potato Chips

The rapidly increasing consumption of potato chips has been caused in a large measure by social customs such as theatre attendance, cocktail parties and, of late and to an increasing degree, the watching of television. On occasions of such entertainment chips often form part of the light refreshments taken.

It is worthy of note that potato chips are not recommended by dietitians as a desirable addition to the food supply of urban dwellers. This is due to the high fat content of the finished chips. The development of the chip industry is very interesting in the light of this fact. The increasing consumption of chips

indicates the degree to which consumers can be influenced by advertising and social custom.

A comprehensive report on the possibilities for a potato chip plant in Manitoba has been prepared for the Provincial Government by Arthur D. Little, Inc.[16/] They considered that the establishment of a plant in Manitoba would be an economically sound venture. Two plants are now in production locally.

(b) Potato Starch

A potato starch industry of considerable size has been developed in the United States. This has been primarily the result of the activities of the United States Department of Agriculture in its potato diversion program. It has been determined that, in order for potato starch to compete in the starch market pricewise, the raw potatoes need to be almost a free good at the factory door. There are, however, specialized uses for potato starch in the textile and paper fields and in the baking and confectionery trades. This cushions the effect of the cheapness of manufacture of the competitive grain starch. It would that a potato starch industry would not be economically feasible in this province at the present time. While there are potato starch plants located in the Atlantic provinces, these plants do not supply the total national demand. There were 2,938,013 pounds of potato starch and flour valued at $227,809 exported in 1957 but 20,206,700 pounds valued at $488,085 were imported by the food industry during the same year. This indicates the possibility for expansion of the industry in suitable areas.

16/ Feasibility of Potato Chip Production in the Province of Manitoba, Arthur D. Little, Inc., Cambridge, Mass., 1956.

(c) Potato Granules

Potato granules have been manufactured for a considerable period of time. Granules were widely used during World War II as a source of potatoes in the diet of troops in the field. Experience has indicated that granules leave much to be desired except for use under similar emergencies. The reconstituted product has the form of a thick gruel in many instances. This is largely due to the release of free starch caused by the rupture of potato cells in the granule manufacturing operation. While a degree of the unpalatability of the reconstituted product may be due to the method of preparation, it is doubtful if consumers are impressed with its appearance on the table. It is unfortunate that at the present time granules are being confused with flakes, a different potato product having much more desirable characteristics.

(d) Potato Flakes

A process for manufacturing potato flakes has been developed by the Agricultural Research Service of the United States Department of Agriculture. Potato flakes can be reconstituted into mashed potatoes which can scarcely be distinguished from those freshly prepared from the raw product. Consumer acceptance tests in American cities have indicated that consumers desire the product for its convenience factor.

Several plants to manufacture flakes have been established in the United States. Canadian patent rights to the American process have been obtained by the Salada-Shirriff-Horsey Company. These rights are all inclusive in Canada. Recent evidence indicates that this company aims to take full advantage of its current monopoly position. This may profoundly influence the development of the flake industry in this country.

(e) Pre-peeled Potatoes

There is a market in the local restaurant trade for pre-peeled potatoes. At the present time a minor pre-peeling operation is carried on by one of the large

wholesales in Winnipeg. The labour requirement is high. Should potato processing such as flake or starch manufacture be developed in the city, pre-peeling could be ancillary to the main operation. The pre-peeling operation has possibilities for the utilization of potatoes culled because of surface defects. With supermarkets becoming increasingly important as retail outlets there are possiblities for sale of prepeeled potatoes to the ultimate consumers. The development of this trade will be dependent upon the relative cost of the pre-peeling operation.

Implications of Processing

Present processes, other than starch manufacture, require good quality potatoes as the raw material. Processing, as a result, does not lend itself to cull utilization. However, processing can be used to shift the demand curve for potatoes and render it more elastic and also provide a measure of market stability by reducing the effect of peak delivery periods. In addition processing, by adding convenience in preparation, has an arresting effect on the decline of the per capita consumption and as a result growers benefit. Utilization of cull potatoes remains a problem for the individual grower to solve.

The Response of Supply to Price

In order to determine how growers respond to price changes, the changes in acreage planted were correlated to changes in price. Since two years of high prices are considered to be followed by a large increase in the acreage planted, use was made of the following equation to estimate changes in acreage from year to year:

$$Y = a + b X_1 + c X_2$$

where Y = per cent change in the potato acreage from the previous year

X_1= the price of potatoes, deflated by the wholesale index, in the year previous.

X_2= the price of potatoes, deflated by the wholesale index, two years previously.

The statistics used in this determination were those supplied by the Manitoba Department of Agriculture in their Annual Report on Crops, Livestock etc. Using the least squares technique the following estimating equation was derived:

$$Y = 91.26391 + 16.15063X_1 - 5.38867X_2$$

The correlation between the estimates derived by using this equation and the actual data was .21948. Gray, Sorenson and Cochrane[17/] used a similar formula to measure the supply-price response in the United States. The correlation between the actual data and estimates based on their derived equation was .8675. In addition, they found that both years used had a positive effect on the change in acreage.

The results obtained here imply that while the change in acreage is influenced positively by the price in the previous year it is influenced negatively by the price two years previous. This phenomenon is contrary to popular opinion. The correlation obtained is quite low and for the purpose of estimating acreage responses to given prices would involve a considerable margin of error.

Several reasons could be suggested to explain the relatively poor correlation. A large number of local growers are of a part-time nature as discussed previously and changes in price may not concern them to the same degree as the commercial grower. In addition, the production statistics apply to many individuals who do not consider themselves potato growers. The basic statistics used are open to criticism since they are estimates rather than actual data. Also, alternative opportunities open to potato growers may have varied from year to year. The lack of adequate statistics prevented an analysis of commercial grower reactions to immediate pre-planting prices which might have indicated a more consistent relationship.

17/ Op. cit., p. 123.

The Risk Factor in Manitoba Potato Production

A measure of risk in the production of any crop is the year to year acre value variability. To make a comparison of the risk involved in growing potatoes with an alternative crop the acre value variability of wheat was calculated as well as that of potatoes over the 1935 to 1957 period. Wheat may not be an alternative crop for certain growers due to their small land areas but since this is the predominant field crop in Manitoba as a whole its use for comparative purposes was considered justified.

Over the 1935-57 period the deflated acre value of potatoes ranged from $32.68 to $112.89 with the coefficient of variability of the acre value being 29.33. On the other hand, the deflated acre value of wheat over the period ranged from $5.85 to $26.70 with the coefficient of variability of the acre value being $27.87. In other words, there is a slightly greater risk involved in the production of potatoes as compared to that of wheat in this province.

The risk involved in potato production has a profound influence on the grower reaction to specialization. This may account for the relative delay of growers in responding to improved cultural techniques which would favour specialization. Let us consider the position of a grower specializing in potatoes as compared to one whose return from potatoes constitutes a minor source of income. Where acre values fluctuate widely, the income of the specialized grower fluctuates similarly. These fluctuations tend to inhibit specialization with its large capital outlay requirements. Unless a grower is very well financed, these wide fluctuations in income could bankrupt him in low price periods before he could recoup his losses in high price periods. On the other hand, part-time or sideline growers are less vulnerable to fluctuations in the acre value of the crop, and subsequently income, because the return from potatoes constitutes a minor portion of their respective

incomes. In fact, the sideline grower may tend to react favourably to the opportunity for what may be the expression of the gambling psychology since the relatively small importance of potatoes in his income enables him to gamble without the grim prospect of economic annihilation. This prospect would be a possibility for the large specialist who was inadequately financed.

Deficiency Payments in Respect to Risk

Subsequent to the foregoing discussion a note on how potato growers, if they make rational decisions, will react to deficiency payments is relevant to this report. Deficiency payments are a form of price subsidy or guaranteed prices. The product is allowed to find its own price level in the market. The "deficiency" in price obtained in the market from the determined "fair" price is made up by direct Government subsidy. The operation of the deficiency payments plan, where it is consistently applied over a prolonged period, becomes a means of guaranteeing prices, or in other words, the parity price concept may be applied under another name.

A guaranteed price reduces price risk. Small growers as well as large favour this idea. However, the reasons for support of the idea by the respective groups differ. Small growers desire these payments because they feel a need for a return of at least their costs of production and they consider guaranteed prices will insure this. Large growers desire deficiency payments to remove the element of risk in price fluctuation. As a result, prolonged operation of a deficiency payments plan for potatoes will have certain effects on the production pattern. The immediate reaction of large growers will be to increase production. With the price risk reduced, these growers will use the large amounts of risk capital released to expand acreage and adopt the latest production technology. This development will lead to chronic overproduction. The price guarantee is of much less importance to the small and part-time grower. The reduction in price risk would tend to have much less

effect on this type of grower at the outset but the ultimate effect would not be entirely favourable. Since the price guarantee would cause large growers to over-produce regularly, a market glut condition would become chronic. The return to the grower under this condition would remain at the deficiency payment price level. The hope for gain in periods of price rise would be removed. As a result, the small grower would become increasingly squeezed and might consider alternative sources of income. Small growers would do well to study the implications of deficiency payments before subscribing to them.

A shift toward large scale production is proceeding at the present time in Manitoba. It is my hypothesis that this shift would accelerate with the advent of deficiency payments. In view of the small scale of operations on the average of the Manitoba grower in relation to his North Dakota competitor this shift is highly desirable from the standpoint of economics. The shift toward larger grower operations will involve further geographic relocation of production areas. The predominately small scale of operations in the area adjacent to Winnipeg will be replaced by large scale operations in areas better suited to mechanization.[18/]

[18/] For an excellent discussion of U. S. producer reactions to price support, see Gray, et. al., op. cit., pp. 76-89.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

Problems of the Industry

It is apparent from this study that there is much room for improvement in production and marketing techniques at the grower level. The solution of these problems will be facilitated by a combination of both Government and grower action. Throughout the study it became obvious that many of the difficulties experienced by growers resulted from the small average scale of operations. This was reflected in the level of cultural practices followed, the storage facilities, the lack of market awareness and the relative lack of mechanization by growers in general. As a result, the local industry is in a somewhat disadvantageous position to competing areas where the scale of operation is greater. In addition, a relocation of production from the heavy clay soils to those of a more friable nature is required to enable mechanization with a subsequent reduction in cost and also the marketing of a more attractive product. Enforcement of grade standards is required to bring about a greater degree of preciseness in the pricing process and an improvement in the general quality of the product marketed. There is a lack of adequate statistics on the existing marketing situation, with little information available on storage holdings, movements outside Winnipeg, and also a lack of preciseness in the recording of prices at the grower, wholesale and retail level. Many of the statistics available, particularly those referring to production, apply to all producers of potatoes which obscures the commercial situation. Grower-consumer relations are poor, with some consumers antagonistic to the local product as a result of past performance. An effort must be made toward improvement in these relations. Labour problems exist at the farm level, due in part to the seasonal nature of the employment offered. While many problems are involved, none are impossible of solution.

Some aids for their solution are currently being applied. Additional efforts are necessary, however.

Responsibilities of Government

There is a responsiblity on the part of Government for solving some of the problems in the industry. While a very valuable service has been rendered growers by the Extension Service, effort should be directed along additional lines to overcome the problems. Some other steps are being taken but as yet no comprehensive plan for potato growers has been offered.

A primary area for Government action is that of adequate grade enforcement. There is a lack of such enforcement at the present time. This results in a lack of preciseness in the price making function and a discounting of prices for the local product is a result of some below-grade or misgraded produce entering the market. The respective areas of Dominion and Provincial Government responsibility in this matter must be adequately defined and positive action taken.

The policy followed by Government should lead to stability in the industry. The present shift of growers between areas and the trend to increased size should be fostered and accellerated by Government policy. Many of the present difficulties arise from the small average size of production units. These difficulties show up in grading techniques, storage facilities, the level of cultural practices followed and the knowledge of market processes. With an increase in the average size of unit many of these problems would disappear. Therefore, credit and land use policies as applied to potato growers should be directed toward enlarging units to economic size in advantageous locations. By so doing the competitive position of local growers with those in the United States and other areas will be improved. These larger units will form a more stable group, with the result that the "in and out" segment will be relatively reduced in importance, thus giving Extension personnel a more adequate opportunity to influence growers as a whole toward improvement in cultural practices.

In addition, these larger units with adequate storage facilities, as observed in the study, tend to provide the market with a more uniform flow. Increase in the scale of potato production generally results in improved efficiency. Since many alternative opportunities exist locally for growers displaced as a result of the enlargement of units, economic hardship occasioned by the shift should be relatively minor.

More adequate statistics should be provided for the local industry and this is a Government responsibility. Through contacts with growers and the trade a degree of distrust of the present statistics was evident. An increase in knowledge of the market through price reports and statistics on storage holdings of both growers and the trade, total commercial movements in the province other than through Winnipeg, as well as commercial production is highly desirable. To date many of the statistics given have applied to the production of individuals who do not consider themselves as potato growers with the result that the commercial market situation has often been obscured.

Other avenues of Government aid could involve continuing research by Extension and University personnel into production and marketing problems, the solution of which will improve the competitive position of the local grower. Labour difficulties experienced by growers could be eased through provision of such an aid as unemployment insurance for farm labour. In addition, self-help efforts by growers should be encouraged. The general role of Government policy should be that of a catalyst in the solution of existing problems.

Responsibilities of Growers

Many of the problems facing the industry could be solved by grower action. While much progress has been made in the recent past in collective action by growers, much more remains to be accomplished. There has been considerable agitation by

growers for the formation of a marketing board with production and marketing control. This plan of action has not as yet been favourably received by the required majority of growers. One of the major objections has been the compulsory features of such a plan, more specifically production control. It is doubtful if production control on any basis, except when indirectly applied through quality restrictions on marketings, has any merit here since restriction would only tend to encourage supply from other areas. However, there is value in having an all-inclusive organization in public relations, in promotion, and for bargaining. Growers are in need of a public relations program. Consumers are critical due to past difficulties experienced with the local product. A proper public relations program will require participation by all growers and this may require a more closely knit organization than the present Vegetable Growers Association. Consumers are largely unaware of the problems faced by local growers and little has been done to acquaint them with the facts. In addition, through a promotion and advertising program, much can be done to increase the acceptance of the local product in the market provided it is backed by quality control. Also, growers are in need of a collective organization to bargain effectively with the economically strong processing organizations entering the field.

Another self-help measure for growers to adopt is that of marketing on a cooperative basis. Member growers have been able to improve their position through such a cooperative and other growers would be well advised to consider the advantages to be achieved through such group action. Savings result in such an organization through efficiencies achieved in grading, packaging and sales performed on a large scale.

Growers can also extend the marketing season to a degree and thus obtain a larger share of the market. As illustrated in this report a degree of improvement

in net return could be expected from following such a course. In the field of labour relations growers can do much to improve the present conditions. Growers should adopt complementary enterprises with a view to providing continuity of employment and render labour a comparative degree of security and return relative to opportunities available elsewhere. Growers should also adopt a more realistic attitude toward price. They are presently preoccupied with trying to raise prices which would probably result in greater production accompanied by reduced returns in a future period.

Growers can also benefit from the adoption of improved business techniques. Individual growers could perhaps achieve greater returns by reorganizing their respective operations than by any other means. A wide range of business ability was inferred by the questionnaires. By following a course of keeping adequate business records followed by analysis with subsequent application of the knowledge obtained most growers could expect a substantial increase in their net returns.

Conclusion

It was obvious in the study that adjustments in both potato production and marketing are occurring as a result of economic forces. Efforts of both Government and growers should be directed toward assisting the change while at the same time alleviating the hardships encountered insofar as possible. Care should be exercised, however, to implement only those policies which lead to improvement in the competitive position of the industry. With Government and growers cooperating, present problems and difficulties experienced by the industry will be overcome. This will allow full utilization of natural advantages giving rise to a stable industry. This in turn will result in a psychologically and economically rewarding occupation.

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